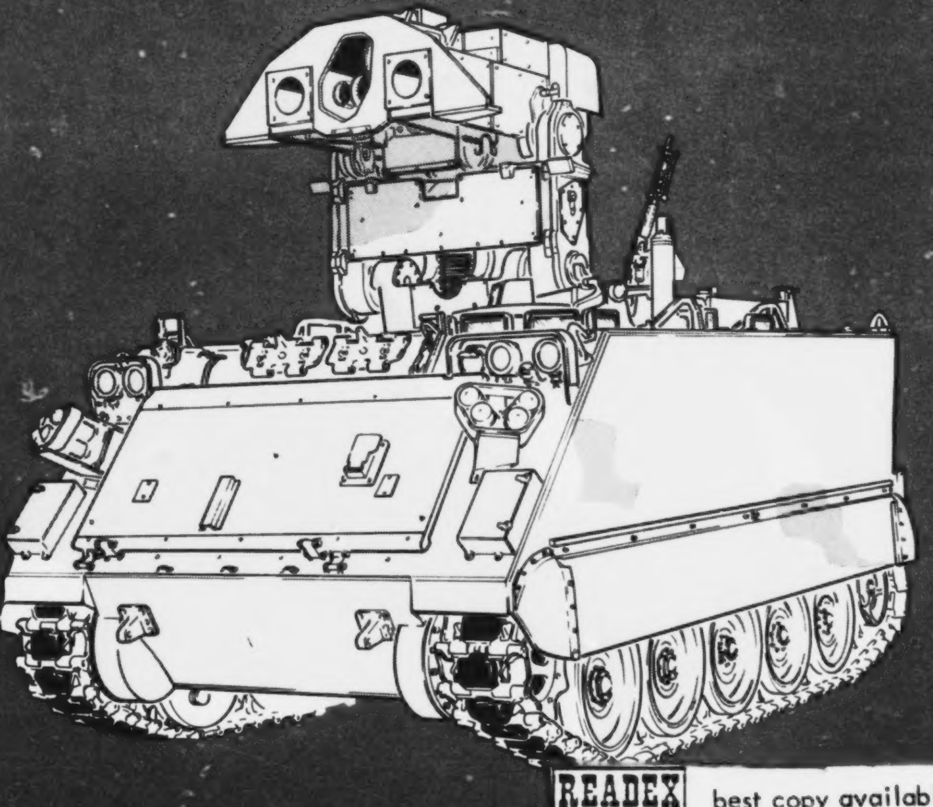
9-2350-259-10/987

TM 9-2350-259-10

OPERATOR'S MANUAL
FOR

COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901

NSN 2350-01-045-1123



READEX FICHE best copy available

JUNE 1979

HEADQUARTERS, DEPARTMENT OF THE ARMY

This copy is a reprint which includes current pages from Changes 1 through 5.

TA 078720

D 101.11:

WARNING

CARBON MONOXIDE CAN KILL. Never operate heater or engine of vehicle in an enclosed area unless it is ADEQUATELY VENTILATED.

HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions. Voltage of the infrared power pack exceeds 16,000 volts.

EAR PROTECTION MUST BE WORN when vehicle is in operation.

Do not touch LOCK BUTTONS ON STEERING LEVERS while vehicle is moving.

Driver cannot steer vehicle with UNIVERSAL JOINTS DISCONNECTED. USE A TOW BAR not a CHAIN to tow a vehicle with disconnected universal joints.

Make sure the MASTER SWITCH is OFF and BRAKES are SET before CRAWLING UNDER VEHICLE.

When using optical viewing devices do not LOOK INTO the SUN or other BRIGHT LIGHTS as this can cause serious eye burn and permanent blindness.

Do not WEAR WATCHES and JEWELRY while working on the BATTERY or on OTHER ELECTRIC COMPONENTS. Always DISCONNECT GROUND CABLE FIRST and CONNECT IT LAST. Make sure POLARITY (+ and –) is NOT REVERSED.

DRY CLEANING SOLVENTS are poisonous. Don't BREATH IN FUMES. Make sure there is plenty of VENTILATION. Avoid contact with skin.

Open COOLANT CAP slowly when engine is HOT. DON'T TOUCH with bare hands.

LEAVE VEHICLE at once when FIRE EXTINGUISHER is USED. CARBON DIOXIDE used in fire extinguishers displaces oxygen in enclosed spaces and can result in suffocation.

Do not OPERATE TURRET with PERSONNEL or LOOSE OBJECTS on deck. Make sure BACKBLAST DANGER AREA is clear of personnel before firing.

Do not fire missiles over POWER LINES.

HANDLE AMMUNITION carefully, DEFECTIVE AMMUNITION must be disposed of by explosive ordnance disposal (EOD) personnel.

WARNING

Do not operate gunner's hand controls unless both the LAUNCHER ERECT and LAUNCHER READY indicators on the gunner's control panel are lit. Failure to observe this warning may cause launcher to fall resulting in serious injury to personnel and damage to equipment.

Low battery voltage during erection of launcher from stow or load position could cause failure of erection arm locks to engage and result in injury to personnel and damage to equipment. If low battery condition exists and turret must be operated using emergency power, refer to this manual for instructions.

During normal operation, monitor BATTERY GENERATOR indicator on driver's instrument panel. If indicator indicates in red sector while turret is operating, stop operation and start engine. Idle engine at 1000 rpm. Note that indicator returns to green sector.

To avoid injury to personnel, contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel (chemical environment).

The lithium batteries used in this equipment are potentially hazardous if misused or tampered with before, during, or after discharge. The following precautions must be strictly observed to prevent possible injury to personnel or damage to equipment.

Before hooking up a tow bar or tow cables, chock the vehicle with blocks so that it cannot move.

Do not heat, incinerate, crush, puncture, disassemble, or mutilate the battery.

Do not short circuit.

Do not store in equipment during long periods of unuse (in excess of 30 days).

Turn off equipment immediately if the battery compartment becomes unduly hot or rapidly increases in temperature, if the battery is venting (hissing sound) or if it has the smell of irritating sulfur dioxide gas. Remove and dispose of the battery only after it is cool (cool to touch).

Do not use carbon dioxide extinguishers on exposed lithium metal fires. Flood the burning material with water or use graphite type compounds or extinguishers to extinguish the burning lithium.

Do not swim the carrier. The carrier may sink and personnel may drown or be injured. Only fording to a depth of 40 inches is allowed.

Choppy water can cause carrier to flood/sink and personnel to drown. If waves are more than 6 inches high, it isn't safe to ford carrier.

*TM 9-2350-259-10
C 5

CHANGE

NO.5

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *25 January 1987*

Operator's Manual
for
COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901
NSN 2350-01-045-1123

TM 9-2350-259-10, 29 June 1979, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised pages are indicated by a vertical bar adjacent to the identification number.

Remove Pages	Insert Pages
b/(c blank)	b/(c blank)
1-7 and 1-8	1-7 and 1-8
1-19 and 1-20	1-19 and 1-20
1-27 and 1-28	1-27 and 1-28
NONE	2-86.1 thru 2-86.3/(2-86.4 blank)
2-102.3 and 2-102.4	2-102.3 and 2-102.4
NONE	2-102.4.1 and 2-102.4.2
2-119 and 2-120	2-119 and 2-120
2-193 thru 2-196	2-193 thru 2-196
2-203 thru 2-209/(2-210 blank)	2-203 thru 2-209/(2-210 blank)
3-67 and 3-68	3-67 and 3-68
Index 3 thru Index 6	Index 3 thru Index 6
Index 15 thru Index 18	Index 15 thru 18
Index 19/(Index 20 blank)	Index 19/(Index 20 blank)

2. File this change sheet in front of the publication for reference purposes.

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*This change supersedes I01, TM 9-2350-259-10, 4 August 1986; I02, 14 August 1986; and I03, 14 January 1987.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R.L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-37, Operator Maintenance requirements for Vehicle, Combat, Antitank, IMPROVED TOW, M901/A1.

Change
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. *10 May 1983*

OPERATOR'S MANUAL
FOR
COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE
M901 — NSN 2350-01-045-1123
M901A1 — NSN 2350-01-103-5641

EXCLUDES M113A1/M113A2 VEHICLE (TM 9-2300-257-SERIES)
AND GROUND TOW COMPONENTS (TM 9-1425-450-SERIES)
OPERATOR INSTRUCTIONS. THESE SYSTEM
PUBLICATIONS ARE NEEDED IN ORDER TO PROVIDE
TOTAL VEHICLE SUPPORT.

TM 9-2350-259-10, 29 June 1979, is changed as follows:

The title is changed to read as shown above.

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
b/(c blank)	b/(c blank)
i/(ii blank)	i
None	ii
1-1 and 1-2	1-1 and 1-2
1-2.5/(1-2.6 blank)	1-2.5/(1-2.6 blank)
1-3 through 1-8	1-3 through 1-8
1-15 through 1-20	1-15 through 1-20
1-23 and 1-24	1-23 and 1-24
1-24.1/(1-24.2 blank)	1-24.1/(1-24.2 blank)
1-25 through 1-28	1-25 through 1-28
1-28.1/(1-28.2 blank)	1-28.1/(1-28.2 blank)
1-29 and 1-30	1-29 and 1-30
1-39 and 1-40	1-39 and 1-40
2-1 and 2-2	2-1 and 2-2
2-8.1/(2-8.2 blank)	2-8.1/(2-8.2 blank)
2-9 and 2-10	2-9 and 2-10
2-20.1 and 2-20.2	2-20.1 and 2-20.2
2-49 and 2-50	2-49 and 2-50
2-50.1/(2-50.2 blank)	2-50.1 and 2-50.2
None	2-52.1/(2-52.2 blank)
2-53 through 2-58	2-53 through 2-58
None	2-58.1 and 2-58.2
2-67 through 2-70	2-67 through 2-70
2-75 through 2-78	2-75 through 2-78

Remove Pages	Insert Pages
None	2-78.1/(2-78.2 blank)
2-79 and 2-80	2-79 and 2-80
2-89 and 2-90	2-89 and 2-90
2-95 and 2-96	2-95 and 2-96
2-102.23 and 2-102.24	2-102.23 and 2-102.24
2-102.41 and 2-102.42	2-102.41 and 2-102.42
2-102.47 and 2-102.48	2-102.47 and 2-102.48
2-102.57 and 2-102.58	2-102.57 and 2-102.58
2-102.63 through 2-102.70	2-102.63 through 2-102.70
2-102.73 through 2-102.76	2-102.73 through 2-102.76
2-107 and 2-108	2-107 and 2-108
2-117 through 2-120	2-117 through 2-120
2-136.1/(2-136.2 blank)	2-136.1 and 2-136.2
None	2-136.3 and 2-136.4
2-137 and 2-138	2-137 and 2-138
2-138.1 and 2-138.2	2-138.1 and 2-138.2
2-139 through 2-142	2-139 through 2-142
None	2-142.1/(2-142.2 blank)
2-143 and 2-144	2-143 and 2-144
2-144.1 and 2-144.2	2-144.1 and 2-144.2
2-147 and 2-148	2-147 and 2-148
2-152.1/(2-152.2 blank)	2-152.1/(2-152.2 blank)
2-156.1/(2-156.2 blank)	2-156.1 and 2-156.2
None	2-156.3 through 2-156.17/ (2-156.18 blank)
2-163 and 2-164	2-163 and 2-164
2-164.3/(2-164.4 blank)	2-164.3/(2-164.4 blank)
2-175 and 2-176	2-175 and 2-176
None	2-176.1 and 2-176.2
2-177 through 2-186	2-177 through 2-186
2-186.1 through 2-186.12	2-186.1 through 2-186.12
2-186.15 and 2-186.16	2-186.15 and 2-186.16
2-187 and 2-188	2-187 and 2-188
2-193 and 2-194	2-193 and 2-194
2-202.1 and 2-202.2	2-202.1 and 2-202.2
3-1 and 3-2	3-1 and 3-2
3-25 and 3-26	3-25 and 3-26
3-37 through 3-40	3-37 through 3-40
3-43 and 3-44	3-43 and 3-44
None	3-44.1/(3-44.2 blank)
3-56.1/(3-56.2 blank)	3-56.1/(3-56.2 blank)
3-57 through 3-60	3-57 through 3-60
None	3-60.1/(3-60.2 blank)
3-61 and 3-62	3-61 and 3-62
4-1 through 4-10	4-1 through 4-10
4-11/(4-12 blank)	4-11 and 4-12
None	4-13/(4-14 blank)
A-1 and A-2	A-1 and A-2

TA 159313

Remove Pages	Insert Pages
B-1 through B-12	B-1 through B-12
B-13/(B-14 blank)	B-13/(B-14 blank)
C-1 and C-2	C-1 and C-2
None	C-4.1/(C-4.2 blank)
C-5 and C-6	C-5 and C-6
D-1 through D-4	D-1 through D-4
E-1 and E-2	E-1 and E-2
E-7 through E-10	E-7 through E-10
F-1 and F-2	F-1 and F-2
None	F-2.1/(F-2.2 blank)
F-5 and F-6	F-5 and F-6
None	F-6.1/(F-6.2 blank)
G-1 through G-16	Index 1 through Index 16
G-17/(G-18 blank)	Index 17 and Index 18
None	Index 19/(Index 20 blank)

2. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

E.C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-37, operator maintenance requirements for Improved TOW Vehicle (ITV), M901/M901A1 (BLOCK 1152).

TA 159314

TM 9-2350-259-10
C3

Change

No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D C, *5 May 1983*

Operator's Manual
for
COMBAT VEHICLE, ANTI-TANK,
IMPROVED TOW VEHICLE, M901
NSN 2350-01-045-1123

EXCLUDES M113A1/M113A2 VEHICLE (TM 9-2300-257-SERIES)
AND GROUND TOW COMPONENTS (TM 9-1425-470-SERIES)
OPERATOR INSTRUCTIONS. THESE SYSTEM
PUBLICATIONS ARE NEEDED IN ORDER TO PROVIDE
TOTAL M901 VEHICLE SUPPORT.

TM 9-2350-259-10, 29 June 1979, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
b/(c blank)	b/(c blank)
1-15 and 1-16	1-15 and 1-16
1-29 and 1-30	1-29 and 1-30
2-19 and 2-20	2-19 and 2-20
2-47 and 2-48	2-47 and 2-48
2-59 through 2-102	2-59 through 2-102
2-102.1 through 2-102.35/(2-102.36 blank)	2-102.1 through 2-102.36
None	2-102.37 through 2-102.77/(2-102.78 blank)
2-141 and 2-142	2-141 and 2-142
2-145 through 2-150	2-145 through 2-150
2 150.1/(2.150.2 blank)	2-150.1/(2-150.2 blank)
2-163 and 2-164	2-163 and 2-164
2-167 and 2-168	2-167 and 2-168
2-199 through 2-202	2-199 through 2-202
2-202.1/(2-202.2 blank)	2-202.1 and 2-202.2
3-21 and 3-22	3-21 and 3-22
3-25 and 3-26	3-25 and 3-26
None	3-26.1/(3-26.2 blank)
3-27 and 3-28	3-27 and 3-28
None	3-28.1 and 3-28.2
3-29 and 3-30	3-29 and 3-30
3-37 through 3-40	3-37 through 3-40
3-40.1/(3-40.2 blank)	3-40.1/(3-40.2 blank)
3-43 and 3-44	3-43 and 3-44

TA 159120

Remove Pages	Insert Pages
3-51 and 3-52	3-51 and 3-52
3-59 and 3-60	3-59 and 3-60
A-1 and A-2	A-1 and A-2
B-3 and B-4	B-3 and B-4
B-7 through B-10	B-7 through B-10
E-1 through E-6	E-1 through E-6
E-15 and E-16	E-15 and E-16
G-1 through G-17/(G-18 blank)	Index-1 through Index-17/(Index-18 Blank)

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General, United States Army
Chief of Staff

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ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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TA 159121

TM 9-2350-259-10
C2

Change
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. *14 October 1981*

Operator's Manual
for
COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901
NSN 2350-01-045-1123

TM 9-2350-259-10, 29 June 1979, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
i/(ii blank)	i/(ii blank)
1-1 and 1-2	1-1 and 1-2
None	1-2.1 through 1-2.5/(1-2.6 blank)
1-3 through 1-12	1-3 through 1-12
1-17 through 1-20	1-17 through 1-20
1-23 and 1-24	1-23 and 1-24
None	1-24.1/(1-24.2 blank)
1-25 through 1-28	1-25 through 1-28
None	1-28.1/(1-28.2 blank)
1-29 through 1-36	1-29 through 1-36
2-1 and 2-2	2-1 and 2-2
None	2-8.1/(2-8.2 blank)
2-9 through 2-14	2-9 through 2-14
None	2-20.1 and 2-20.2
2-21 and 2-22	2-21 and 2-22
2-25 through 2-30	2-25 through 2-30
2-39 through 2-42	2-39 through 2-42
2-49 and 2-50	2-49 and 2-50
None	2-50.1/(2-50.2 blank)
2-51 and 2-52	2-51 and 2-52
2-59 through 2-101/(2-102 blank)	2-59 through 2-102
None	2-102.1 through 2-102.35/ (2-102.36 blank)
2-105 and 2-106	2-105 and 2-106
None	2-106.1/(2-106.2 blank)
2-107 and 2-108	2-107 and 2-108
None	2-108.1/(2-108.2 blank)
2-111 and 2-112	2-111 and 2-112
None	2-112.1/(2-112.2 blank)
2-113 through 2-116	2-113 through 2-116
2-121 and 2-122	2-121 and 2-122

TA 158076

Remove Pages	Insert Pages
2-125 through 2-130	2-125 through 2-130
2-133 and 2-134	2-133 and 2-134
None	2-134.1/(2-134.2 blank)
2-135 and 2-136	2-135 and 2-136
None	2-144.1 and 2-144.2
2-145 through 2-148	2-145 through 2-148
None	2-148.1/(2-148.2 blank)
2-149 and 2-150	2-149 and 2-150
None	2-150.1/(2-150.2 blank)
None	2-152.1/(2-152.2 blank)
2-153 and 2-154	2-153 and 2-154
2-160.1 and 2-160.2	2-160.1 and 2-160.2
2-165 and 2-166	2-165 and 2-166
2-171 through 2-178	2-171 through 2-178
None	2-186.1 through 2-186.18
2-187 and 2-188	2-187 and 2-188
None	2-194.1/(2-194.2 blank)
2-195 and 2-196	2-195 and 2-196
2-201 and 2-202	2-201 and 2-202
None	2-202.1/(2-202.2 blank)
3-15 and 3-16	3-15 and 3-16
3-21 and 3-22	3-21 and 3-22
None	3-22.1/(3-22.2 blank)
3-23 and 3-24	3-23 and 3-24
3-27 through 3-30	3-27 through 3-30
3-37 and 3-38	3-37 and 3-38
None	3-40.1/(3-40.2 blank)
3-51 and 3-52	3-51 and 3-52
None	3-56.1/(3-56.2 blank)
3-57 and 3-58	3-57 and 3-58
3-61 and 3-62	3-61 and 3-62
None	3-62.1/(3-62.2 blank)
3-63 and 3-64	3-63 and 3-64
4-1 through 4-4	4-1 through 4-4
A-1 and A-2	A-1 and A-2
B-3 through B-12	B-3 through B-12
C-1 through C-6	C-1 through C-6
D-1 through D-3/(D-4 blank)	D-1 through D-4
E-7 through E-16	E-7 through E-16
E-19 and E-20	E-19 and E-20
F-1 through F-8	F-1 through F-11/(F-12 blank)
G-1 through G-16	G-1 through G-16
None	G-17/(G-18 blank)
Old 2028 Forms	New 2028 Forms

2. File this change sheet in front of the publication for reference purposes.

TA 158077

By Order of the Secretary of the Army

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General, United States Army
Chief of Staff

Official

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

Distribution
To be distributed in accordance with DA Form 12-37, Operator maiantenance requirements for Improved TOW Vehicle (ITV), M901.

TM 9-2350-259-10
C1

Change
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 16 November 1979

Operator's Manual
for
COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901
NSN 2350-01-045-1123

TM 9-2350-259-10, 29 June 1979, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised pages are indicated by a vertical bar adjacent to the identification number.

Remove Pages	Insert Pages
None	b/(c blank)
1-17 and 1-18	1-17 and 1-18
2-15 and 2-16	2-15 and 2-16
2-37 and 2-38	2-37 and 2-38
2-59 and 2-60	2-59 and 2-60
2-65 and 2-66	2-65 and 2-66, 2-66.1 and 2-66.2
2-73 and 2-74	2-73 and 2-74
2-79 and 2-80	2-79 and 2-80
2-91 through 2-94	2-91 through 2-94
2-107 and 2-108	2-107 and 2-108
None	2-136.1/(2-136.2 blank)
2-137 through 2-140	2-137 through 2-138.2 through 2-140
2-143 and 2-144	2-143 and 2-144
2-145 through 2-148	2-145 through 2-148
2-153 and 2-154	2-153 and 2-154
None	2-156.1/(2-156.2 blank)
2-157 through 2-162	2-157 through 2-160.2 through 2-162
None	2-164.1 through 2-164.3/ (2-164.4 blank)
2-165 and 2-166	2-165 and 2-166
2-185 and 2-186	2-185 and 2-186
2-203 and 2-204	2-203 and 2-204
3-63 and 3-64	3-63, 3-64 and 3-64.1/(3-64.2 blank)
4-1 and 4-2	4-1 and 4-2
4-7 and 4-8	4-7 and 4-8
C-1 through C-6	C-1 through C-7/(C-8 blank)
E-3 through E-14	E-3 through E-14

TA 112677

Remove Pages	Insert Pages
E-23 and E-24	E-23 and E-24
E-27 and E-28	E-27 and E-28
G-1 through G-10	G-1 through G-10
G-13 and G-14	G-13 and G-14

2. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

E.C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-37, operator maintenance requirements for Improved TOW Vehicle (ITV), M901.

TECHNICAL MANUAL

No. 9-2350-259-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *29 June 1979*

OPERATOR'S MANUAL
FOR
COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE
M901 — NSN 2350-01-045-1123
M901A1 — NSN 2350-01-103-5641

EXCLUDES M113A1/M113A2 VEHICLE (TM 9-2300-257-SERIES) AND GROUND TOW COMPONENTS (TM 9-1425-450-SERIES) OPERATOR INSTRUCTIONS. THESE SYSTEM PUBLICATIONS ARE NEEDED IN ORDER TO PROVIDE TOTAL VEHICLE SUPPORT.

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, U.S. Army Tank-Automotive Command, ATTN: DRSTA-MB, Warren, MI 48090. A reply will be furnished to you.

TABLE OF CONTENTS

			Page
CHAPTER	1	INTRODUCTION	1-1
Section	I	General Information	1-1
Section	II	Equipment Description	1-5
Section	III	Technical Principles of Operation	1-23
CHAPTER	2	OPERATING INSTRUCTIONS	2-1
Section	I	Description and Use of Operator's Controls and Indicators	2-1
Section	II	Preventive Maintenance Checks and Services	2-59
Section	III	Operation Under Usual Conditions	2-103
Section	IV	Operation Under Unusual Conditions	2-188
CHAPTER	3	MAINTENANCE INSTRUCTIONS	3-1
Section	I	Lubrication Instructions	3-1
Section	II	Troubleshooting	3-2
Section	III	Maintenance Procedures	3-39
CHAPTER	4	AMMUNITION	4-1

TA 159315

APPENDIX A. REFERENCES A-1
APPENDIX B. COMPONENTS OF END ITEM LIST B-1
APPENDIX C. ADDITIONAL AUTHORIZATION LIST C-1
APPENDIX D. EXPENDABLE SUPPLIES AND MATERIALS LIST .. D-1
APPENDIX E. SIGN GUIDE E-1
APPENDIX F. STOWAGE PLAN AND TIEDOWN STRAP GUIDE .. F-1
INDEX .... Index 1

TA 159316

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

SCOPE

Type of Manual. This manual describes the operation of, and provides operating and maintenance instructions for the M901/M901A1 Combat Vehicle, Anti-Tank, Improved TOW Vehicle. It is bound in the new log book style and has many pictures for ease of reading.

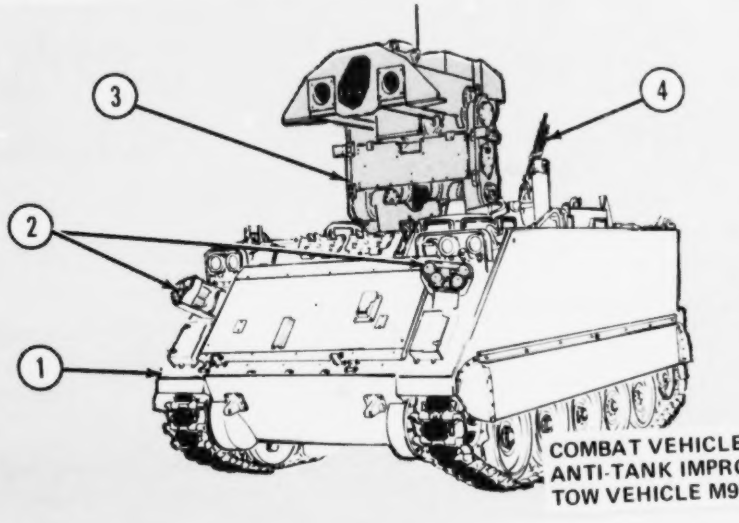
This manual covers only authorized crew maintenance, which is limited by time and tools carried on the vehicle. Any maintenance problems not covered should be referred to organizational maintenance personnel.

NOTE

Each of the two basic models, the M901 and the M901A1, may use the M113A1 or M113A2 personnel carriers for the chassis. Procedures and illustrations in this manual pertain to all models except where specifically stated.

Major Assembly Groups. The major assembly groups of the vehicle are as follows:

The Combat Vehicle, Anti-Tank, Improved TOW Vehicle, M901/M901A1 (1), the smoke grenade launcher M243 (2), the guided missile turret assembly (3), the TOW launcher M220A1 (not shown), the radio communications set AN/GRC-160 or AN/VRC-64 (not shown), the M60, 7.62 mm machinegun (4), and the intercommunications set AN/VIC-1 (V), (not shown).



COMBAT VEHICLE
ANTI-TANK IMPROVED
TOW VEHICLE M901/M901A1

TA 159122

SCOPE

Purpose of Equipment. The vehicle provides the Army with a highly mobile and effective anti-tank weapon with maximum protection to the individual soldier.

MAINTENANCE FORMS AND RECORDS

Maintenance Request Form, DA Form 2407, is used to request support maintenance for the vehicle. To use this form, see TM 38-750. Other Department of The Army forms and procedures that are used for equipment maintenance are also described in TM 38-750, The Army Maintenance Management System (TAMMS).

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's).

EIR's can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just tell why the design is bad or why a procedure is hard to do. EIR's may be submitted on SF 368, Quality Deficiency Report. Mail them directly to: Commander, U.S. Army Tank-Automotive Command, ATTN: DRSTA-M, Warren, Michigan 48090. A reply will be furnished.

TA 157841

REFERENCE INFORMATION

This listing includes the nomenclature cross reference list, list of abbreviations, and explanation of terms (glossary) used in this manual.

A. NOMENCLATURE CROSS REFERENCE LIST

NOTE

Since the printing of this basic manual, the following items have had nomenclature name changes. The old nomenclatures will appear until the total manual is revised. When information is added or changed, new item nomenclatures will be used.

CROSS-REFERENCE LIST

Present Nomenclature	Revised Nomenclature
Adapter Assembly, Vision Field-of-Sight, Optics	Actuator Assembly: Fire Control
Air Vent, Personnel	Register, Metal: Personnel Air Vent
Amplifier, Intercom	Intercom Amplifier
Amplifier, Power Supply	Amplifier
Arming Device, Remote	Remote Control System: Arming Assembly
Auxiliary Reservoir	Auxiliary Reservoir: Below Deck Hydraulic
Battery Box, Gunner's Seat	Battery Box: Gunners Platform
Battery, TOW	Battery Assembly, Storage
Bellows	Bellows, Rubber
Box Assembly, Missile Guidance System	Box, Vehicular Access: Missile Guidance Set

TA 157831

CROSS-REFERENCE LIST - Continued

Present Nomenclature	Revised Nomenclature
Box, Intercom	Control, Intercom
Bracket Housing, Assembly, Remote Control, Nightsight	Bracket Assembly, Remote Control
Brake, Electromagnetic, Energize to Release (Slew and Track)	Brake, Electric: Slew and Track
Brush Guard, Smoke Grenade Dispenser	Guard Assembly, Brush: Smoke Grenade Launcher
Chassis Assembly, Gunner's Level/Nightsight Controls	Indicator, Level, Gunners
Commander's Viewing Device	ITV Squad Leader's Periscope
Control Assembly, Power	Power Control Assembly
Control Unit, Power	Power Control Unit
Daysight/Tracker	Sight, Optical, Guided Missile Launcher
Differential Assemblies	Differential Gear Unit: Azimuth Drive Assembly
Diopter Ring	Focusing Ring
Direct Vision Port, Rear Access Door	Door, Vision Block: Rear Access
Dispenser, Smoke Grenade	Grenade Launcher
Door, Access, Forward Protection, Armor	Cover Assembly, Forward: Launcher
Driver's Hatch Assembly	Door, Hatch, Vehicle: Drivers
Driver's Periscope	Periscope, M19

TA 157833

CROSS-REFERENCE LIST - Continued

Present Nomenclature	Revised Nomenclature
Erection Arm Assembly, Launcher	Erection Arm Assembly: TOW Assembly ITV Armament
Erector Launcher Arm Assembly	TOW Assembly, Improved TOW Vehicle Armament
Eyepiece Housing and Eyepiece Assembly	Eyepiece Assembly
Fire Interrupt/Intercom Assembly	Fire Interrupt, Intercom Assembly
Forward Missile Support	Support, Missile, Forward
Fuel Tank	Fuel Compartment
Generator, Tachometer	Azimuth Tachometer Assembly: Gear Box Housing Assembly
Gun Mount/Arm Assembly	Mount Assembly, Machine Gun: Secondary Weapon
Hand Controller	Hand Control Subassembly: Power Control Assembly
Handle Assembly, Manual Control, Missile Latching, Launcher	Handle Assembly, Missile: Launcher
Hatch, Gunner's Cupola, Turret	Hatch, Vehicular: Gunners Cupola
Head Assembly, Upper	Head Assembly: Tank Periscope
Image Transfer Assembly	Periscope, Tank
Indicator, Level Position, Driver's	Level, Indicator Assembly: Drivers

TA 157834

CROSS-REFERENCE LIST - Continued

Present Nomenclature	Revised Nomenclature
Infrared (IR) Periscope	Periscope, M19
Intercom Set	Intercommunication Set, AN/VIC-1(V)
Lamp, Indicator, Level	Lamp, Incandescent
Latch Assembly, Gunner's Hatch	Latch, Cupola Hatch: Gunners Internal
Latch, Cargo Hatch, Door	Latch Assembly, Cargo
Launcher, Guided, Missile	Launcher Assembly
Lens and Housing Assembly	Lens and Housing Assembly: Narrow Field of View
Lens Assembly, Wide Angle Objective	Cell Assembly, Optical: Wide Angle Objective
Light Assembly, Indicator, Level	Light, Panel: Gunners Level Indicator and Nightsight Controls
M26 Periscope	Periscope, M26
Machine Gun, M60	Machine Gun, 7.62 - mm, M60
Machine Gun, Mounting Assembly	Mount, Secondary Weapon
Manual Sight Selector	Multichannel Positioning Mechanism Handle
Missile Latch Assembly, Launcher	Latch Missile: Launcher
Motor, Hydraulic, Azimuth	Motor, Hydraulic
Mount, Pintle, Secondary Weapon	Mount, Machine Gun: Pintle

TA 157835

CROSS-REFERENCE LIST - Continued

Present Nomenclature	Revised Nomenclature
M901 Vehicle	Combat Vehicle, Anti-Tank Improved TOW Vehicle, M901
M901A1 Vehicle	Combat Vehicle, Anti-Tank Improved TOW Vehicle, M901A1
Nightsight (M901)	Sight, Vision, Night, AN/TAS-4 Infrared
Nightsight (M901A1)	Sight, Vision, Night, AN/TAS-4A Infrared
Panel Assembly, Control	Control Panel, Assembly
Persicope, Squad Leader's	Telescope, Panoramic, Tank Vehicle
Plate Assembly, Forward	Plate, Forward Armor
Platform Assembly, Gunner's Seat	Platform Assembly, Gunners
Platform, Rotating, Gunner's Seat	Platform Assembly: Gunners Seat
Pump and Motor Assembly, Power Control	Pump Unit, Rotary: Power Control Unit
Pump, Hydraulic	Pump, Hydraulic: Power Control Rotary Pump Unit
Rack, Missile, Upper and Lower	Rack Storage: Lower and Upper Missile
Radio	Receiver-Transmitter
Rail, Secondary Weapon	Rail Assembly Machine Gun: Secondary Weapon Mount
Seat Pan, Mod, Personnel	Seat, Vehicular
Smoke Greande Arming Firing Unit	Switch Assembly: Smoke Grenade Launcher
Squad Leader's Periscope	ITV Squad Leader's Periscope

TA 159123

CROSS-REFERENCE LIST - Continued

Present Nomenclature	Revised Nomenclature
Strut Assembly, Hold Open, Gunner's Hatch	Latch Assembly, Cupola: Gunners Hatch External
Support Assembly, Yoke, Pop-Up Hatch	Yoke Support Assembly: Pop-Up Hatch
Tachometer, Mechanical Fixed	Generator, Tachometer: Erection Arm-Launcher Assembly
Traverse Mechanism	Traversing Mechanism: Azimuth Drive Assembly
Traversing Rail	Secondary Weapon Rail
Vision Block, Cupola	Block, Direct Vision

B. LIST OF ABBREVIATIONS

A or amps	Amperes
ac	Alternating current
ASP	Ammunition Supply Point
APC	Armored Personnel Carrier
Az	Azimuth
BO	Blackout
BRT	Brightness
CB or CKT BRK	Circuit Breaker
ccw	Counterclockwise
CTRS	Contrast
cw	Clockwise
dc	Direct Current
EIR	Equipment Improvement Recommendation
ELEV or EL	Elevation
EMER	Emergency
EOD	Explosive Ordnance Disposal
F	Fahrenheit
FOV	Field-of-View
IR	Infrared
ITA	Image Transfer Assembly

TA 157837

REFERENCE INFORMATION

ITV	Improved TOW Vehicle
kg	Kilogram
km	Kilometers
LO	Lubrication Order
MGS	Missile Guidance Set
kHz	Kilohertz
MHz	Megahertz
MTOE	Modified TOE
OSS	Daysight/Tracker
PA	Post Amplifier
PWR	Power
rpm	Revolutions per minute
TAMMS	The Army Maintenance Management System
TM	Technical Manual
TOE	Table of Organization and Equipment
TOW	Tube launched, Optically tracked, Wire guided
TVPC	TOW Vehicle Power Conditioner
Vac	Volts, alternating current
Vdc	Volts, direct current
VPC	Vehicle Power Conditioner (Nightsight)
WFOV	Wide Field-of-View
X (as in 3X)	Magnification

C. GLOSSARY

ambient	Surrounding on all sides, example: ambient temperature
azimuth	Compass angle
boresight	To aline a sight with a weapon
breech	That part of a weapon into which the ammunition is loaded
carbon monoxide	A poisonous gas
collimator	Instrument that aids in alining optics
desiccant	Any item or compound that absorbs moisture
elevate	To raise
swimming	Crossing a body of water
inert	Not filled with explosives
infrared	Invisible light, having a heating effect
muzzle	Front end of a weapon
slew	Turn fast in azimuth
toxic	Poisonous
track	To keep sight on moving target
traverse	To turn in azimuth

TA 159124

Section II. EQUIPMENT DESCRIPTION

USE OF THE COMBAT VEHICLE, ANTI-TANK, IMPROVED TOW VEHICLE, M901/M901A1

The Combat Vehicle, Anti-Tank, Improved TOW Vehicle, M901/M901A1 is a highly mobile, heavy, anti-tank weapon designed and built to attack and defeat armored vehicles and other targets such as field fortifications. It is normally used by armored cavalry and mechanized infantry units.

Mechanized infantry vehicles will often be deployed with and in support of tanks on offensive operations. On defensive operations, mechanized infantry vehicles will be used to provide long-range anti-tank fire.

Armored cavalry squadrons and scout platoons will use the vehicle for reconnaissance and security operations. This includes participation in offensive, defensive, or retrograde operations. The vehicle for armored cavalry will routinely be used in covered and concealed overwatch positions.

FEATURES AND CAPABILITIES

The M901/M901A1 combat vehicle combines the basic capabilities and features of the M113A1 or M113A2 armored personnel carrier and the TOW heavy anti-tank/assault weapon system and adds additional features. Some of the important capabilities of the M901/M901A1 combat vehicle are as follows:

- High first-round hit probability.
- Crew and weapon protection from small arms fire and artillery fragments.
- Rapid engagement rate. A second round can be selected, armed, and fired as soon as the first round impacts. Additional rounds can be loaded and fired in less than 40 seconds.
- Squad leader has 360 degrees viewing through squad leader's periscope.
- Can operate from concealed positions and full hull defilade.
- Firing coverages of 360 degrees in azimuth and +35 to −30 degrees in elevation.
- Stowage provisions have been provided for ground-mode components. Ground system can be dismounted and set up in less than 3 minutes.

TA 159125

FEATURES AND CAPABILITIES

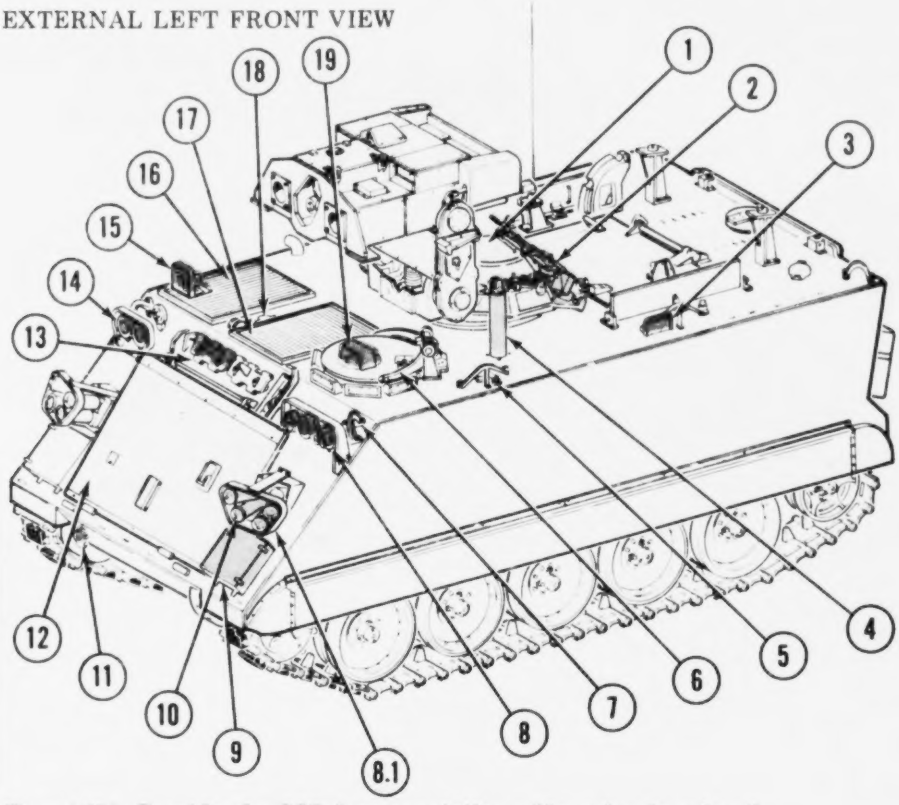
- Provides capability for swimming small bodies of water.
- System is air transportable on military aircraft.
- Day or night acquisition and tracking of targets.

LOCATION AND DESCRIPTION OF COMPONENTS

NOTE

The terms right, left, front, and rear are used in this manual to describe areas and parts of the vehicle and their locations relative to each other. The terms are used the same way a person would use them if he stood at the ramp end of the vehicle and looked forward.

EXTERNAL LEFT FRONT VIEW



Turret (1). Provides for 360 degrees rotation of launcher in azimuth. Allows launcher to be elevated and depressed.

M60 Machinegun (2). Provides area and supporting fire.

M26 Periscope (3). One on each side of the vehicle gives crew a clear field-of-view to the left and right of the vehicle.

TA 157844

LOCATION AND DESCRIPTION OF COMPONENTS

Squad Leader's Periscope (4). Rotates throughout 360 degrees and lets squad leader observe area and select targets.

External Fixed Fire Extinguisher Control Handle (5). When pulled out, activates the fixed fire extinguisher inside the vehicle's engine compartment.

Driver's Hatch (6). When closed, protects driver from enemy fire and missile backblast. Opens to give driver a clear view of terrain.

Front Lifting Eyes (7). Used to lift vehicle for shipment and maintenance (one on each side).

Left Headlight Cluster (8). Contains head lamp, blackout driving light, blackout markers, parking lights, and infrared light.

Brush Guard (8.1). One brush guard around each smoke grenade discharger protects the discharger from damage.

Smoke Grenade Stowage Box (9). Two boxes, one on each side, provide stowage for eight grenades. Each box holds four grenades.

Smoke Grenade Discharger (10). Each discharger consists of four launch tubes holding one grenade each. The arming firing unit (control box) is mounted on the firewall in the crew compartment.

Towing Hooks (11). Used to tow vehicle when vehicle is disabled.

Trim Vane (12). Provides stability during water operations.

Spare Track Shoe (13). Two spares are provided for emergency repair of track.

Right Headlight Cluster (14). Contains headlights, blackout markers, infrared light, and horn.

Exhaust Pipe and Exhaust Pipe Protector (15). Expels exhaust gases from vehicle.

Exhaust Grille (16). Allows warm air to escape after passing through radiator core for cooling.

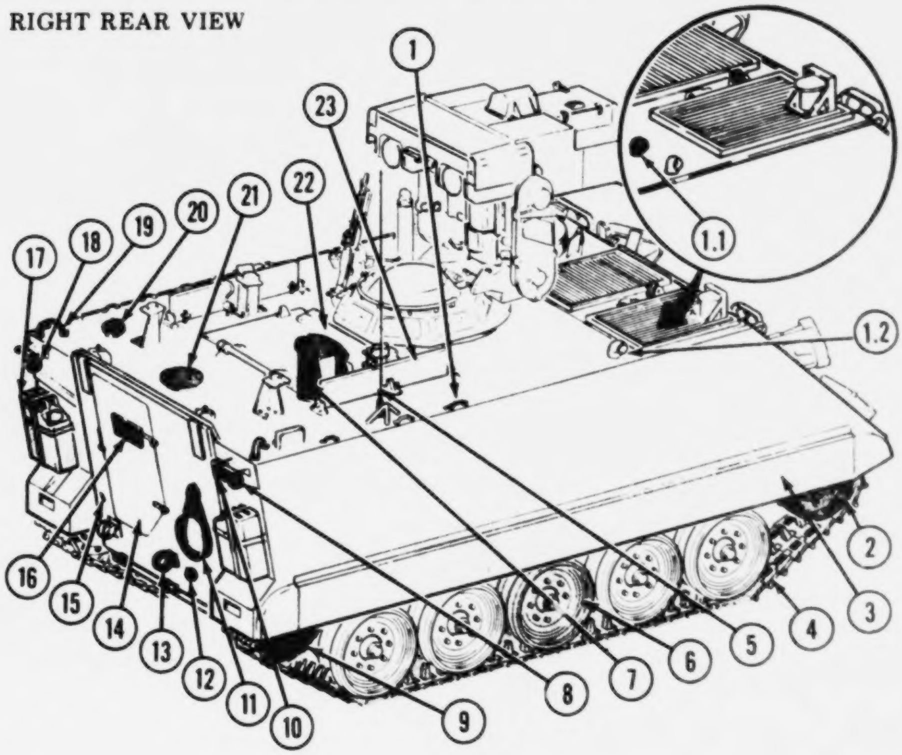
Air Intake Grille (17). Admits fresh, cool air for combustion and for cooling.

Engine Coolant Cover (18). Protects cooling system from overhead fire. Opens for checking and replenishing of engine coolant.

M19 Periscope (19). A night vision device that gives the driver a clear view to the front of the vehicle while driving in darkness.

LOCATION AND DESCRIPTION OF COMPONENTS

RIGHT REAR VIEW



Tiedown Hook (1). Used to tie down equipment.

Personnel Heater Air Inlet (1.1). Provides fresh air for personnel heater on vehicle,using the M901/M113A2 and M901A1/M113A2 chassis. (On vehicle with M901/M113A1 and M901A1/M113A1 chassis, the personnel heater air inlet is below deck in crew compartment.)

Personnel Heater Exhaust (1.2). Expels exhaust gases from personnel heater.

Drive Sprocket (2). Turns track to move vehicle.

Track Shroud (3). Assists in moving and in steering the vehicle during swimming operations.

Track (4). Moves the vehicle.

Radio Antenna (5). Receives and sends radio signals.

Road Wheels (6). Support vehicle. There are five pairs of wheels on each side for a total of 20 wheels.

TA 159126

LOCATION AND DESCRIPTION OF COMPONENTS

Cargo Hatch Support (7). Supports hatch in two open positions.

Right Taillight Assembly (8). Contains blackout stop light and blackout markers.

Idler Wheel (9). Keeps track alined with road wheels and drive sprocket. Maintains track tension.

Telepost (10). Provides a means of hooking up an external telephone.

Tow Cable (11). Used for towing a disabled vehicle.

Trailer Electrical Connector (12). Provides an electrical hookup for operation of trailer lights.

Towing Pintle (13). Used to tow a trailer or other vehicle.

Ramp Door (14). Provides access to vehicle.

Ramp (15). Provides for quick evacuation and boarding of personnel, and facilitates loading of equipment.

Rear Door Vision Block (16). Provides crew with a field-of-view to the rear of the vehicle from inside of vehicle with door closed and ramp up.

Water Can (17). Used to carry fresh water for troop consumption and decontamination.

Left Taillight Assembly (18). Contains taillight, blackout markers, and stop light.

Rear Lifting Eye (19). Used to lift vehicle for shipping or maintenance (one on each side).

Fuel Cap Cover (20). Protects fuel tank from overhead fire, dirt and debris, and backblast. Can be locked from inside of vehicle.

Vent Cover (21). Protects vent and crew from overhead fire and shell fragments.

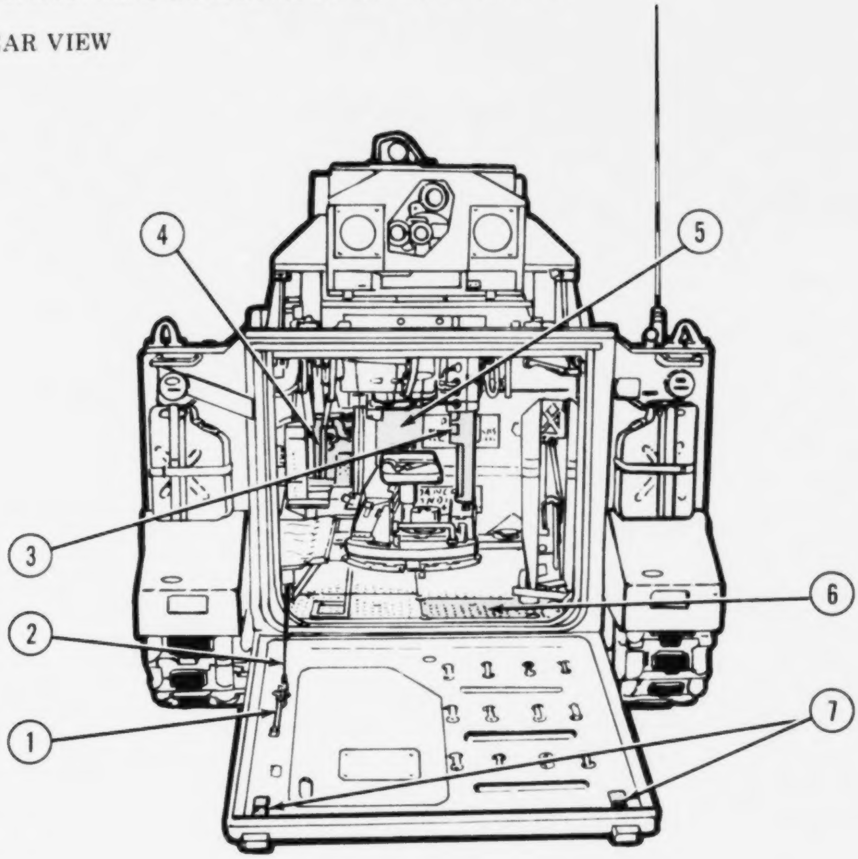
Cargo Hatch (22). Provides overhead protection for crew members from backblast and enemy fire. It opens and locks in three open positions.

Side Armor (23). Protects loader from small arms fire and fragments located on both sides.

TA 157847

LOCATION AND DESCRIPTION OF COMPONENTS

REAR VIEW



Ramp Door Locking Handle (1). Latches and unlatches ramp door.

Ramp Cable (2). Raises and lowers ramp.

Lower Part of Turret (3). Integral part of turret.

Driver's Compartment (4). Contains controls and indicators for driving the vehicle.

Engine Compartment Rear Access Panel (5). Provides access to engine compartment for inspection and maintenance.

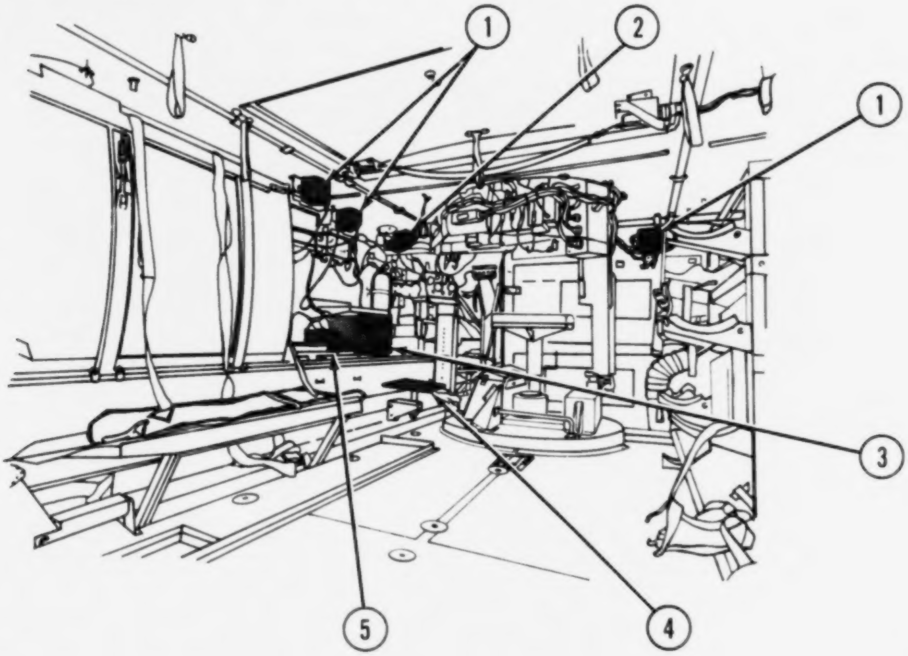
Ramp Cylinder Access Cover (6). Provides access to hydraulic operating cylinder of ramp hydraulic system.

Ramp Lock (7). Automatically latches ramp in locked position when raised.

TA 070732

LOCATION AND DESCRIPTION OF COMPONENTS

INTERIOR VIEW — LEFT WALL



Intercom Control (C-2298/VRC) (1). Two control boxes are on the left wall, one is in the driver's compartment (not shown), one is at the gunner's station, and one is at the right rear (not shown), providing for hookup of headsets to intercom system.

Front Domelight (2). Provides for interior lighting; white light for normal operations and red light for blackout conditions.

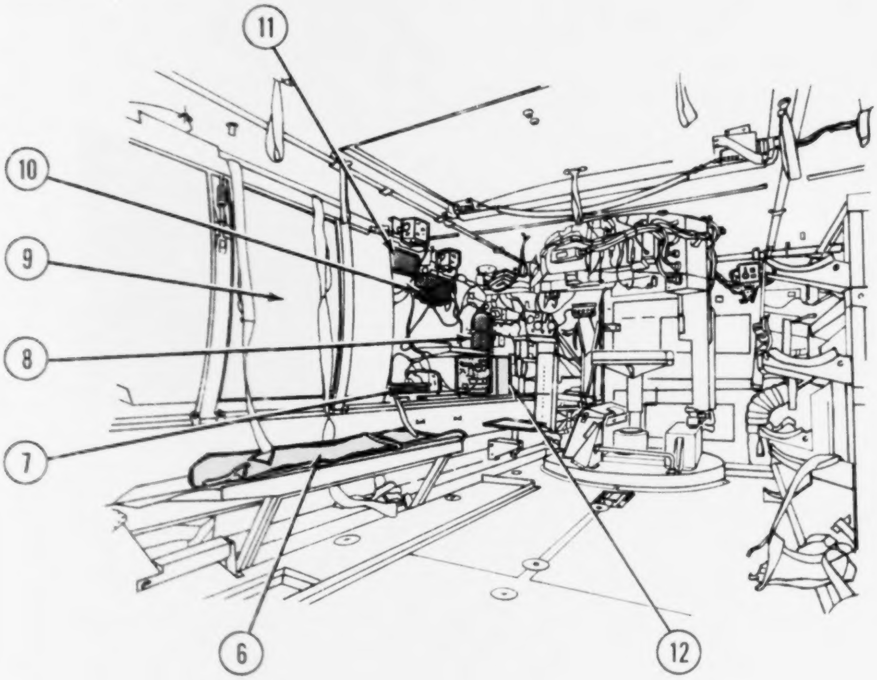
Radio Set AN/VRC-64 or AN/GRC-160 (3). Provides crew with a communication facility to receive and send messages from and to other vehicles or stations.

Squad Leader's Seat (4). Used by squad leader while using the squad leader's periscope.

Electrical Transient Suppressor MX-7778/GRC (5). Used to turn on power for communications system. It also protects radio circuits from voltage spikes that may be caused by vehicle starting and from overloads or shorts in the radio circuits.

TA 070733

LOCATION AND DESCRIPTION OF COMPONENTS



Troop Seat (6). Provides seating for two crewmen.

Traversing Unit Mount (7). Stows traversing unit. Unit is used in ground-emplaced mode of operation of the TOW system.

Fixed Fire Extinguisher (8). Used to put out fires in engine compartment.

Fuel Tank (9). Holds 95 gallons of fuel for vehicle operation.

Intercom Amplifier AM-1780/VRC (10). Controls operation of intercommunications system.

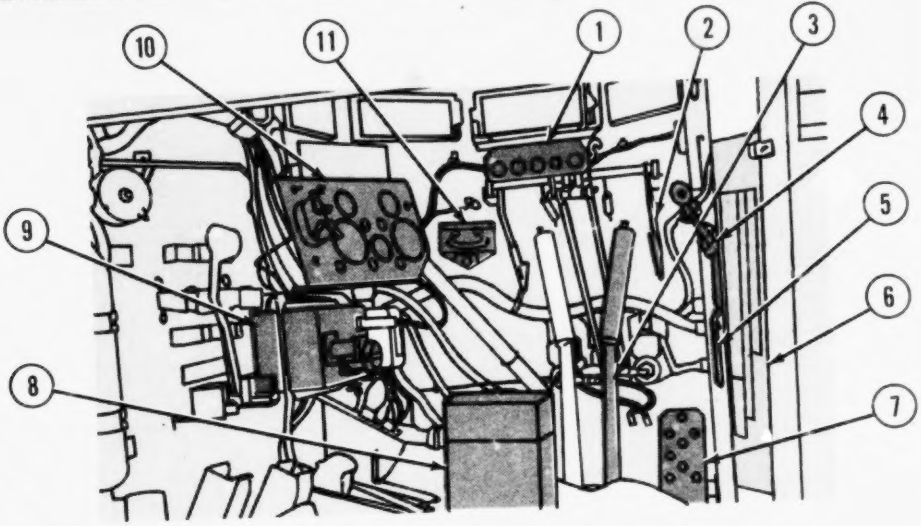
M26 Periscope (11). Provides for observation of area to the left of vehicle.

Spare Missile Guidance Set Battery (12). Provides power for ground-employed MGS or vehicle employed MGS when TVPC is inoperable.

TA 157848

LOCATION AND DESCRIPTION OF COMPONENTS

INTERIOR VIEW – DRIVER'S COMPARTMENT



Warning Lights Panel (1). Warns driver of certain no go conditions in vehicle power pack; also has horn button and HI-LO beam indicator.

Pivot Steering Levers (2). Used to make sharp turns at a standstill or at very low speed. They are also used for swimming.

Differential Steering Levers (3). Used for steering vehicle at normal speeds. (There is no steering wheel.)

Range Selector (4). Used to select proper gear ratio (shifting).

Ramp Control Lever (5). Provides for power operation of rear ramp.

Power Plant Access Panel (6). Protects driver and crew from excessive engine noise, heat, and carbon monoxide gas; opens for servicing of power plant.

Accelerator Pedal (7). Controls engine speed.

Driver's Seat (8). Adjusts for driving with hatch open or closed.

MASTER SWITCH Panel (9). Contains vehicle MASTER SWITCH and other operator's controls and indicators.

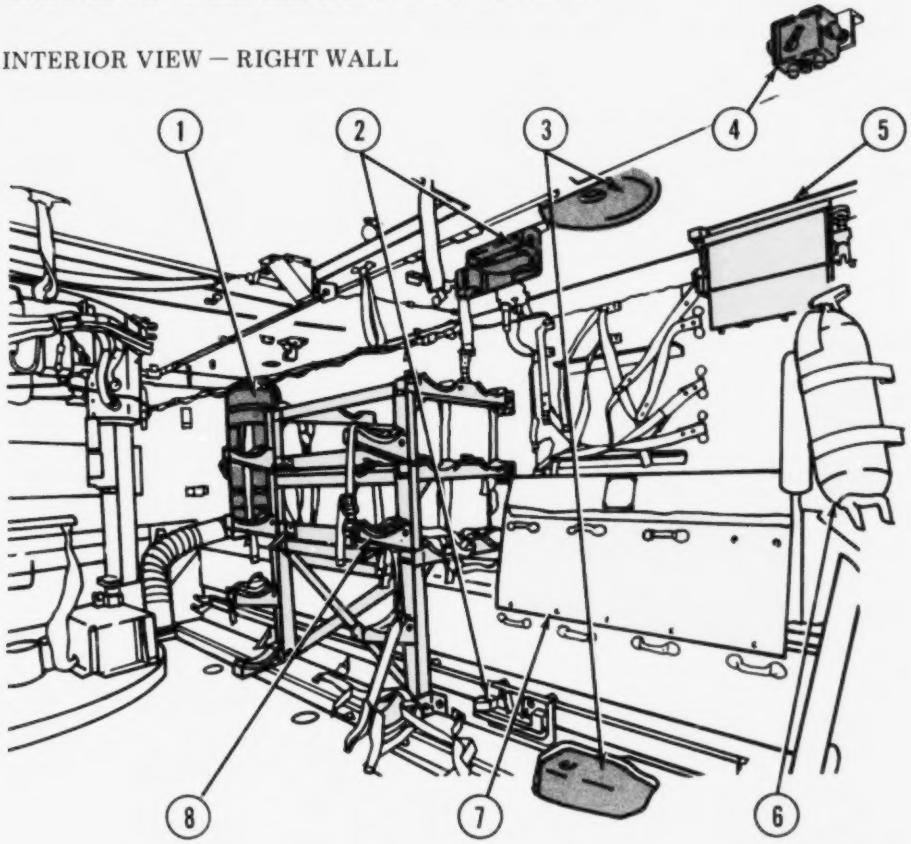
Driver's Instrument Panel (10). Contains switches and indicators necessary for vehicle operation.

Level Indicator (11). Shows driver angle of vehicle when on slope.

TA 070735

LOCATION AND DESCRIPTION OF COMPONENTS

INTERIOR VIEW — RIGHT WALL



Personnel Heater (1). Used for personal comfort of troops in cold weather.

Launch Tube Stow Bracket (2). Stows TOW launch tube. Tube is used in ground-emplaced mode of TOW system.

Tripod Stow Bracket (3). Secures TOW tripod to vehicle. Tripod is used in ground-emplaced TOW system.

Loader's Intercom Control (C-2298/VRC) (4). Provides for hookup of loader's headset to intercom system.

M26 Periscope (5). Provides for area observation to the right of the vehicle.

Portable Fire Extinguisher (6). Carried for protection against fire.

Vehicle Battery Box (7). Contains batteries which deliver power for vehicle and turret operation.

Missile Rack (8). Provides space for ten TOW missiles.

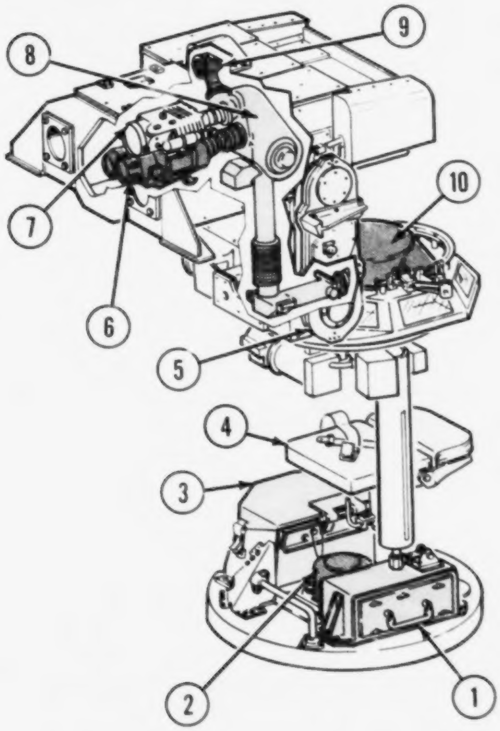
TA 070736

LOCATION AND DESCRIPTION OF COMPONENTS

TURRET ASSEMBLY

NOTE

Nightsight shown is for M901 application. (See page 2-53 for nightsight used on M901A1.)



Weapons Station Emergency Power Battery (1). Provides emergency control power to turret if vehicle power is disabled. It also serves as spare battery for the missile guidance set.

Slipring Assembly (2). Makes electrical connections between vehicle and turret.

Missile Guidance Set (MGS) (3). Receives missile and line-of-sight position information in the form of electrical signals from the tracker and converts them to missile command signals to be sent to the missile thru the guidance wire.

Gunner's Seat (4). Adjusts for various heights of gunners.

Erection Arm (5). Supports launcher and drives launcher to the erect, stow, and load positions.

Daysight/Tracker (6). Used for acquiring and tracking targets.

Nightsight (7). Enables gunner to track during limited visibility and hours of darkness.

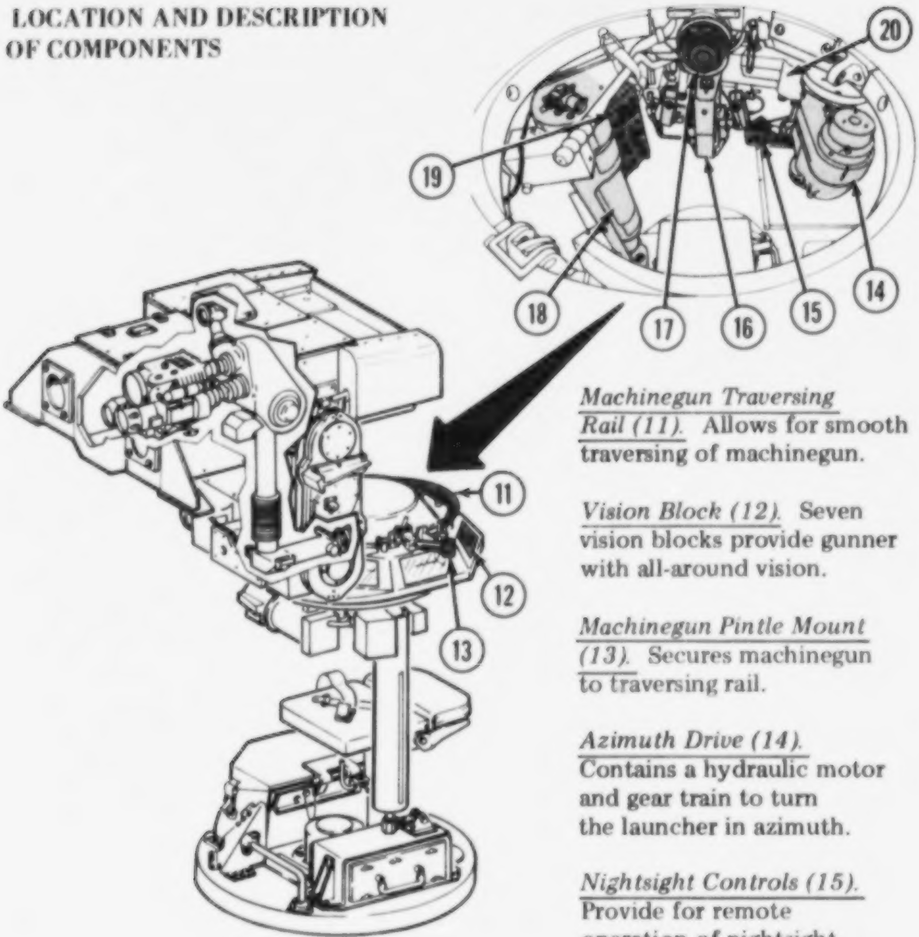
Image Transfer Assembly (ITA) (8). A three-channel periscope that lets the gunner acquire and track targets from below the top deck.

3X Telescope (9). Part of the ITA assembly. It gives the gunner a wide, 25-degree field-of-view, for target acquisition.

Gunner's Hatch Cover (10). Protects gunner from overhead fire when closed; opens for emergency evacuation, area observation, and firing of machinegun.

TA 159127

LOCATION AND DESCRIPTION OF COMPONENTS



Machinegun Traversing Rail (11). Allows for smooth traversing of machinegun.

Vision Block (12). Seven vision blocks provide gunner with all-around vision.

Machinegun Pintle Mount (13). Secures machinegun to traversing rail.

Azimuth Drive (14). Contains a hydraulic motor and gear train to turn the launcher in azimuth.

Nightsight Controls (15). Provide for remote operation of nightsight.

Hand Controls (16). Provide the controls for tracking, slewing and firing. Also allow the gunner to select the desired optics.

Eyepiece (17). Part of ITA. Gunner views target through the eyepiece while tracking the target. Rubber eyeshield protects eye of gunner.

Hydraulic Accumulator (18). Provides for storage of hydraulic fluid under pressure. Unit is precharged with nitrogen from 850—1150 psi depending on temperature.

Gunner's Control Panel (19). Contains the controls and indicators to erect, load, and stow the launcher, and to select and arm or safe missiles in the launcher.

Hydraulic Supply Pump and Motor (20). Contains a supply of hydraulic fluid. Pressurizes hydraulic system for operation of turret.

TA 158941

TABULATED DATA

GENERAL

Armament	
Primary	TOW Missile Launcher
Secondary	M6O Machinegun
Crew (including driver)	
Mechanized infantry	4 men
Armored cavalry	5 men

SIZE

Length (all models) (including water can)	191.5 in.
Width	
Widest (overall)	105.75 in.
Narrowest (track shrouds off)	100 in.
Height (with M901/M113A1 and M901A1/M113A1)	
Maximum (to top of erected launcher)	133.25 in.
Minimum (to top of launcher in stow position)	114.75 in.
Minimum (to top of launcher in airlift position)	102.2 in.
Clearance above ground	16.12 in.
Height (with M901/M113A2 and M901A1/M113A2)	
Maximum (to top of erected launcher)	134.25 in.
Minimum (to top of launcher in stow position)	115.75 in.
Minimum (to top of launcher in airlift position)	103.2 in.
Clearance above ground	17.12 in.

WEIGHT (WITH M901/M113A1 AND M901A1/M113A1)

With full load (gross)	26,000 lbs
Ground pressure at gross (under wheels)	86.8 psi

TA 159128

TABULATED DATA

WEIGHT (WITH M901/M113A2 AND M901A1/M113A2)

With full load (gross)	26,175 lbs
Ground pressure at gross	85.8 psi

CENTER OF GRAVITY (WITH M901/M113A1 AND M901A1/M113A1) (LAUNCHER IN STOW POSITION, VEHICLE FULLY LOADED)

Mechanized infantry	
Height above ground	44.6 in.
Distance behind center of drive sprocket	80.1 in.
Armored cavalry	
Height above ground	44.6 in.
Distance behind center of drive sprocket	80.5 in.

CENTER OF GRAVITY (WITH M901/M113A2 AND M901A1/M113A2) (LAUNCHER IN STOW POSITION, VEHICLE FULLY LOADED)

Mechanized infantry	
Height above ground	45.7 in.
Distance behind center of drive sprocket	80 in.
Armored cavalry	
Height above ground	45.7 in.
Distance behind center of drive sprocket	80.4 in.

TA 159129

TABULATED DATA

PERFORMANCE (LAND)

Fastest forward speed:	
Range 1	10 mph
Range 1-2	22 mph
Range 1-3	40 mph
Range 2-3	40 mph
Cruising range at 25 mph avg	300 miles
Steepest grade	60 percent
Steepest side slope	30 percent
Highest wall climb	2 ft
Widest trench	5.5 ft

PERFORMANCE (WATER)

Fastest forward speed	3.6 mph
Fording depth	40 inches deep

ENGINE

Type	6 cylinder V-type two-stroke diesel
Horsepower	210 at 2800 rpm
Idle speed	650-700 rpm
Maximum governed speed	
Full load	2800 rpm
No load	2925-2975 rpm
Normal operating temperature range	160°-230°F
Cooling	liquid cooled w/radiator and fan
Lubrication	forced feed
Fuel:	
DF-2 (VV-F-800)	only at temperatures above 32°F
DF-1 (VV-F-800)	only at temperatures above −10°F
DF-A (VV-F-800)	any temperature
CITE (MIL-F-46005)	any tem perature

TABULATED DATA

REFILL CAPACITIES

Coolant	
with M901/M113A1 and M901A1/M113A1	12 gal
with M901/M113A2 and M901A1/M113A2	14 gal
Radiator cap pressure rating	13-18 psi
Oil:	
Engine	18 qt
Transmission	16 qt
Differential	20 qt
Transfer gearcase	2.5 qt
Final drive (each)	3.5 qt.
Fan gearbox	0.5 pt
Diesel fuel:	
Capacity	95 gal
Safe filling rate	50 gpm
Ramp hydraulic system	2 qt

RAMP HYDRAULIC SYSTEM

Type fluid	OHA (MIL-H-5606)
Capacity	2 qts

TURRET

Power Requirements	
Voltage	+24 Vdc
Amperes	210 maximum
Hydraulics	
Type fluid	OHA (MIL-H-5606) or FRH (MIL-H-46170)
Capacity (fluid)	2.52 gallons
Accumulator gas	Nitrogen (BB-N-411, Grade B)
Accumulator gas pressure (after bleeddown)	
Ambient Temperature	Pressure
Less than 5°F	850 psi ± 100 psi
5°F to 30°F	900 psi ± 100 psi
30°F to 55°F	950 psi ± 100 psi
55°F to 85°F	1000 psi ± 100 psi
85°F to 110°F	1050 psi ± 100 psi
above 110°F	1100 psi ± 100 psi
Ammunition	10 TOW missiles (all types)

TA 159130

TABULATED DATA

IMAGE TRANSFER ASSEMBLY

General Data	
Weight	140 lb maximum
Pressurization	3 psi
Gas type	Nitrogen (Fed. Spec. BB-N-411C, Type I, class 1 grade A or B; or MIL-P-2740, Type I, grade A, B, or C.)

OPTICAL CHARACTERISTICS

3X Telescope	
Power	3X
Field-of-View	25°
Daysight Channel (Daysight/Tracker installed)	
Power	13X
Field-of-View	5.5°
Nightsight Channel (Nightsight installed)	
Narrow Field-of-View	
Power	12X
Field-of-view (horizontal)	2.2°
Field-of-view (vertical)	1.1°
Wide Field-of-View	
Power	4X
Field-of-View (horizontal)	6.8°
Field-of-View (vertical)	3.4°

MACHINEGUN

Model	M60
Weight	23.16 lbs
Length	43.5 in. (overall)
Ammunition	7.62 mm, all types
Rates of fire:	
Sustained	100 rounds per minute (change barrel every 10 minutes)
Rapid	200 rounds per minute (change barrel every two minutes)
Cyclic	Approximately 550 rounds per minute (change barrel every minute)
Type of operation	Gas operated
Method of feeding	Disintegrating link belt
Capacity of ammunition container	100 rds (200 rds in stowed mode)

TA 070743

TABULATED DATA

SQUAD LEADER'S PERISCOPE

Overall dimensions	
Length	33 in.
Diameter	6 in.
Weight	60 lbs (approx.)
Height above deck	22 in.
Height above deck to line-of-sight	20 in.
Pressurization	2 psi
Gas	Nitrogen (Fed. Spec. BB-N-411C, Type I, class 1, grade A or B; or MIL-P-2740, Type I, grade A, B, or C.)
Optical characteristics	
Power	4X
Field-of-View	12.5°
Azimuth rotation	360° (continuous)
Elevation	10° (max)
Depression	20° (max)

PERISCOPE, M17 (Driver's Periscope)

Overall dimensions	
Length	3 in.
Width	8.75 in.
Height	8.25 in.
Weight	6.5 lbs
Optical characteristics	
Power	1X
Horizontal field-of-view	150°
Vertical field-of-view	50°

PERISCOPE, M19 (Infrared Periscope)

Overall dimensions	
Length	6 in.
Width	8.25 in.
Height	15.25 in.
Weight	16 lbs
Optical characteristics	
Power	1X
Field-of-View	26.8°

PERISCOPE, M26

Overall dimensions	
Length	3 in.
Width	9 in.
Height	12 in.
Optical characteristics	
Power	1X
Field-of-view	26.8°

TA 070744

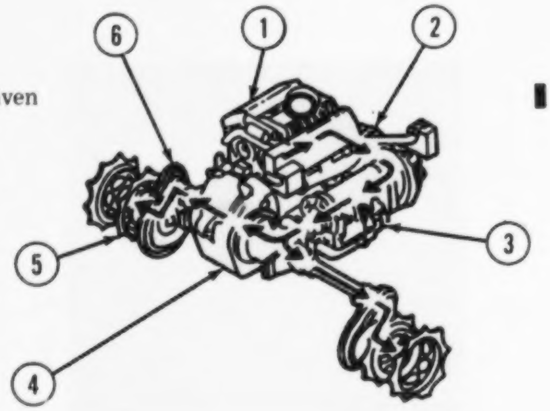
Section III. TECHNICAL PRINCIPLES OF OPERATION

SCOPE

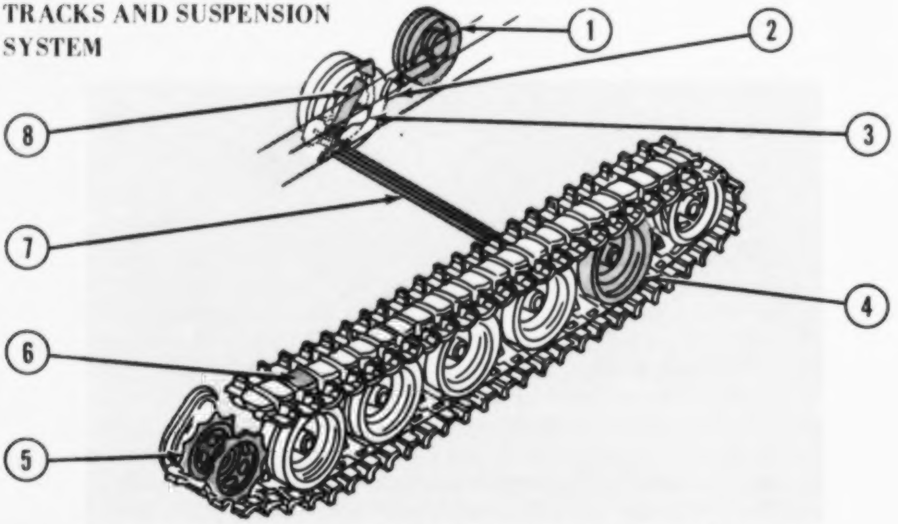
The purpose of this section is to familiarize the user with only the technical principles of operation. For detailed operating instructions, see Chapter 2.

POWER TRAIN

The M901/M901A1 vehicle is driven by a water-cooled diesel engine. Engine torque flows from the engine (1) to the transfer gears (2) to the transmission (3) to the differential (4) to the final drives (6). The final drives are coupled to the drive sprockets (5) which turn the tracks.



TRACKS AND SUSPENSION SYSTEM

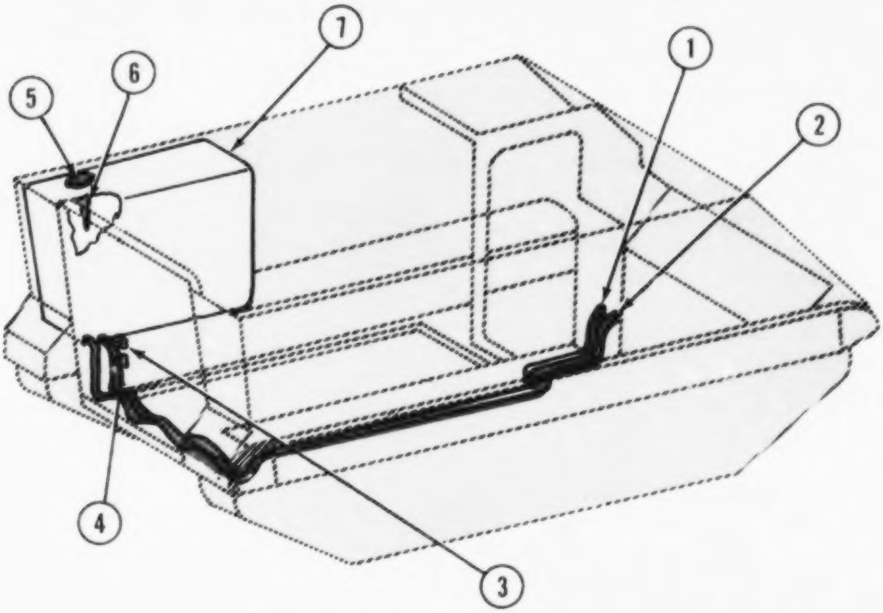


The vehicle is supported by 20 road wheels (4) (5 pairs on each side). Each pair of road wheels is individually mounted to the vehicle with a torsion bar (7) and road wheel arm (3). The vehicle is further cushioned against road shock by the rubber shoed track (6), the rubber outer surfaces of the road wheels, and shock absorbers (8) on the first (front) and fifth (rear) pairs of road wheels. The vehicle with M901/M113A2 and M901A1/M113A2 chassis also has shock absorbers on the second road wheel pairs.

Track alinement is maintained by the sprockets (5) and idler wheels (1). Track tension is adjusted at the track adjusters (2).

TA 159131

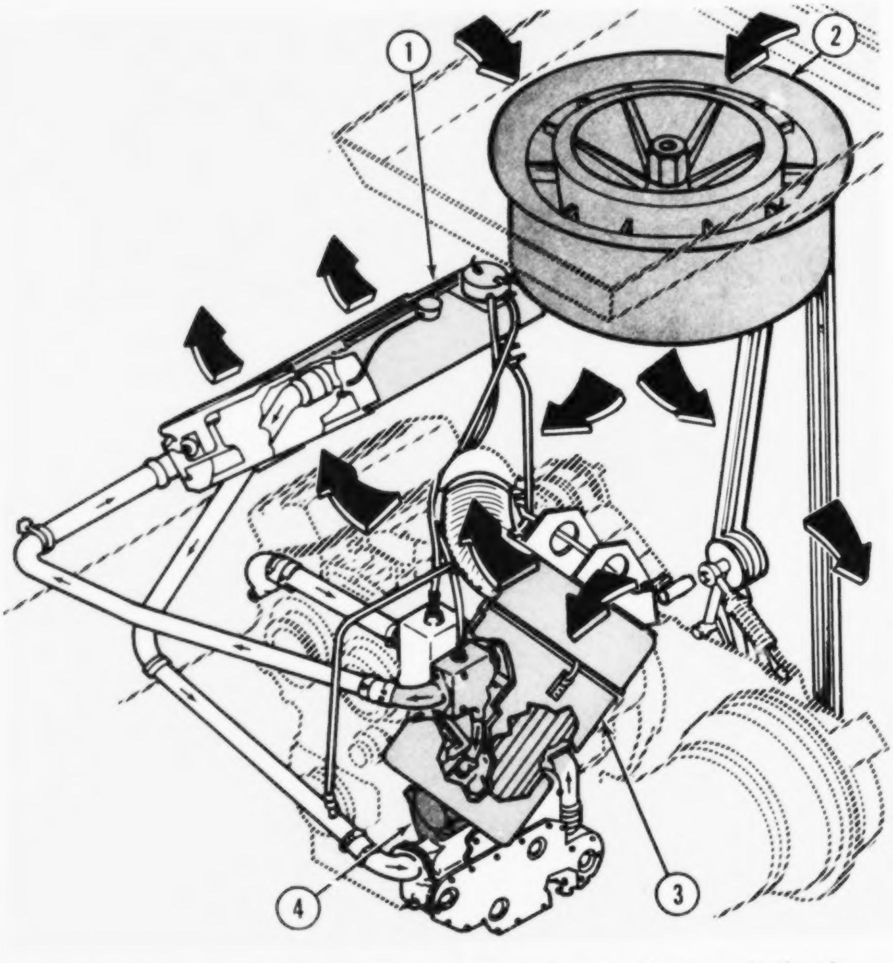
FUEL SYSTEM



Fuel is introduced into the vehicle at the fuel filler tube (5) on top of the vehicle. The filler tube contains a fuel strainer (6) that keeps dirt and other impurities out of the system. With the engine running, fuel flows from the bottom of the fuel tank (7) to the primary and secondary fuel filters in the engine compartment, thru the fuel supply line (2) under the floor of the vehicle. The fuel filters (not shown) filter out additional impurities before the fuel enters the engine thru the fuel injectors. A drain valve (3) at the bottom of the fuel tank allows maintenance personnel to drain the 95-gallon tank and/or to drain an accumulation of water at the bottom of the tank. Unused fuel is returned to the tank by the fuel return line (1). Fuel flow to the engine can be shut off at the fuel flow control valve (4).

TA 070746

ENGINE AIR INTAKE, EXHAUST SYSTEM, AND COOLING SYSTEM (M901/M113A1 AND M901A1/M113A1)

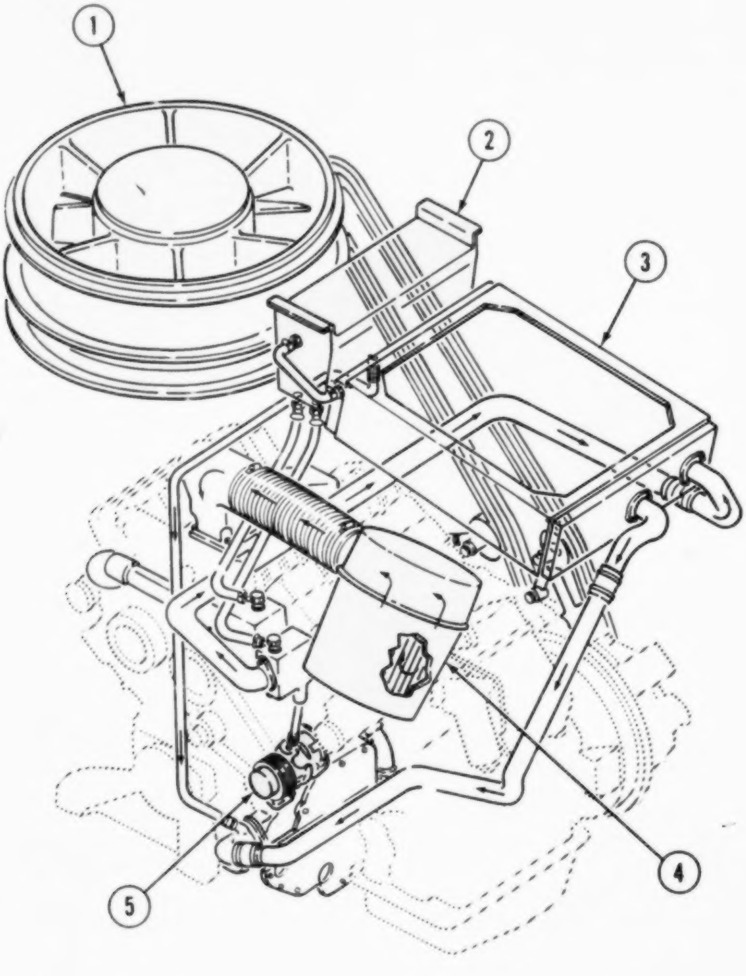


Fresh air for cooling and engine fuel combustion is sucked in through the air intake grille (top of vehicle) by the fan assembly (2). It is filtered in the air cleaner (3) prior to entering the engine under slight pressure. Part of the fresh air coming in from the fan is circulated around the engine compartment and escapes through the exhaust grille, removing excess heat from the cooling system as it passes through the radiator core (1). Engine coolant is circulated thru ports in the engine block by the coolant pump (4) to keep the engine at operating temperature.

Engine exhaust gases escape thru the exhaust pipe which goes through the exhaust grille.

TA 159132

ENGINE AIR INTAKE, EXHAUST SYSTEM, AND COOLING SYSTEM (M901/M113A2 AND M901A1/M113A2)



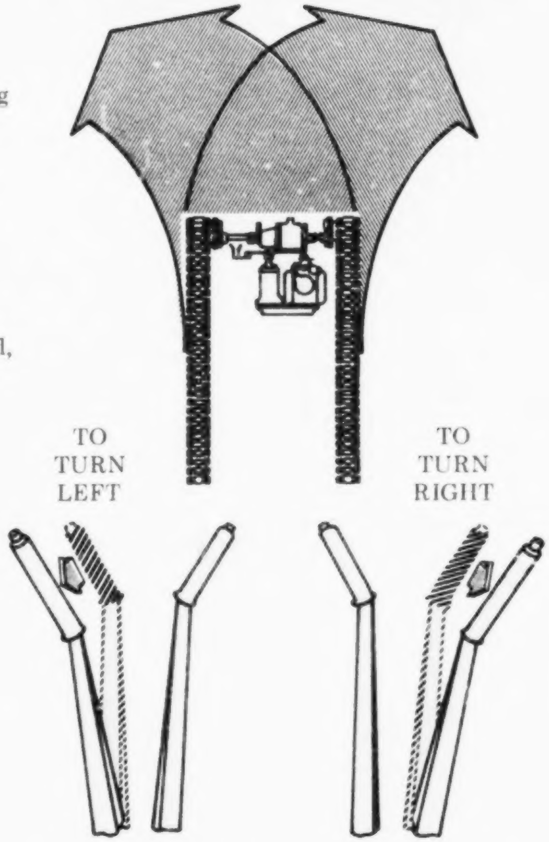
Fresh air for cooling and engine fuel combustion is sucked in through the air intake grille (top of vehicle) by the fan assembly (1). It is filtered in the air cleaner (4) prior to entering the engine under slight pressure. Part of the fresh air coming in from the fan is circulated around the engine compartment and escapes through the exhaust grille, removing excess heat from the cooling system as it passes through the radiator (3). Cooling capacity is increased by auxiliary tank (2). Engine coolant is circulated thru ports in the engine block by the coolant pump (5) to keep the engine at operating temperature.

Engine exhaust gases escape through the exhaust pipe which goes through the exhaust grille.

TA 159133

DRIVING, STEERING, AND STOPPING THE VEHICLE

The vehicle is steered by pulling on the differential steering levers in the driver's compartment which act on the differential steering mechanism. Pulling back on the right lever, for example, with the range lever in one of the forward driving ranges and while depressing the accelerator pedal, will slow or stop the right side drive sprocket.



With the left sprocket driving the left track forward at normal speed, the vehicle will make a right turn. To make a left turn, the left steering lever is pulled back. The vehicle will stop when both levers are pulled back. PIVOT STEER LEVERS, (not shown) operate on the same principle, but turn the vehicle in a much shorter radius. THEY ARE ALSO USED FOR QUICK STOPS IN EMERGENCIES.

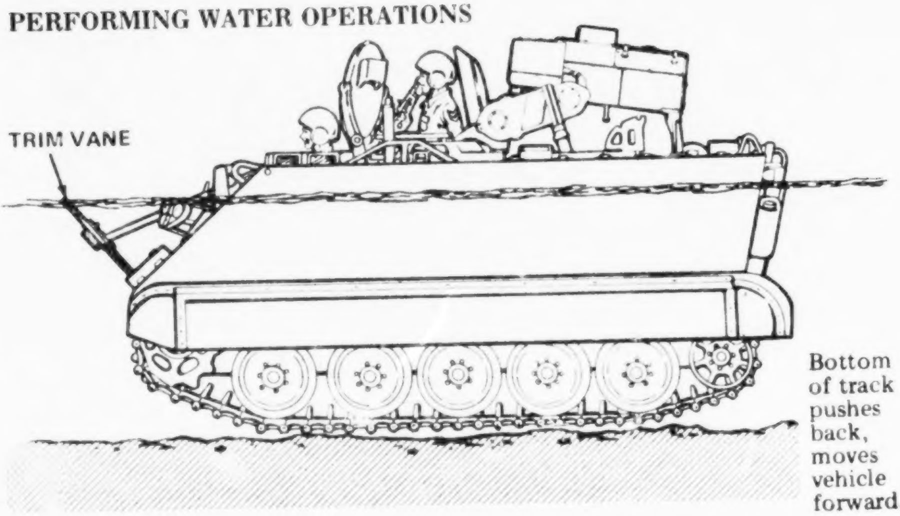
CAUTION

Pivot steering should not be used unless the vehicle is at a standstill or traveling at low speed.

Vehicle shifts automatically within the three forward and one reverse positions of the shifting lever.

TA 070748

PERFORMING WATER OPERATIONS



Bottom of track pushes back, moves vehicle forward.

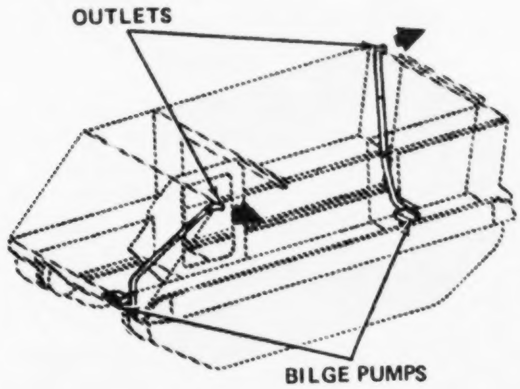
CAUTION

Vehicle doesn't respond to steering commands in water as quickly as it does on land.

The M901/M901A1 vehicle can ford water up to 40 inches deep. The vehicle is steered in water in the same way as it is on land, but only the pivot steering levers are used.

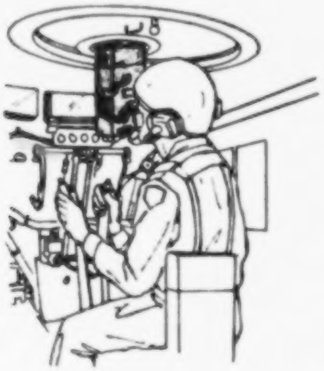
The trim vane is used for stability when the vehicle is in water. Without it the downward pressure on the front of the vehicle would be greater than the upward pressure, due to the shape of the vehicle, causing the vehicle to pitch down and swamp when accelerated.

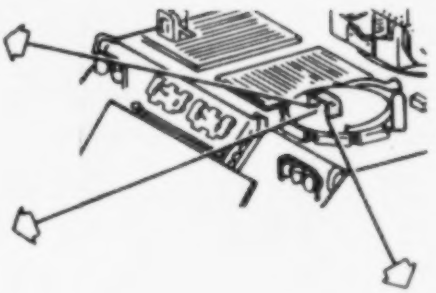
BILGE PUMPS



Two bilge pumps, one in the front of the vehicle and one in the rear, pump out any water in the vehicle that may have been caused by leaks.

DRIVING WITH THE IR PERISCOPE





The IR periscope, when installed in the driver's hatch cover, is used for night driving. The IR periscope operates similar to a TV camera, but is sensitive to heat rather than visible light.

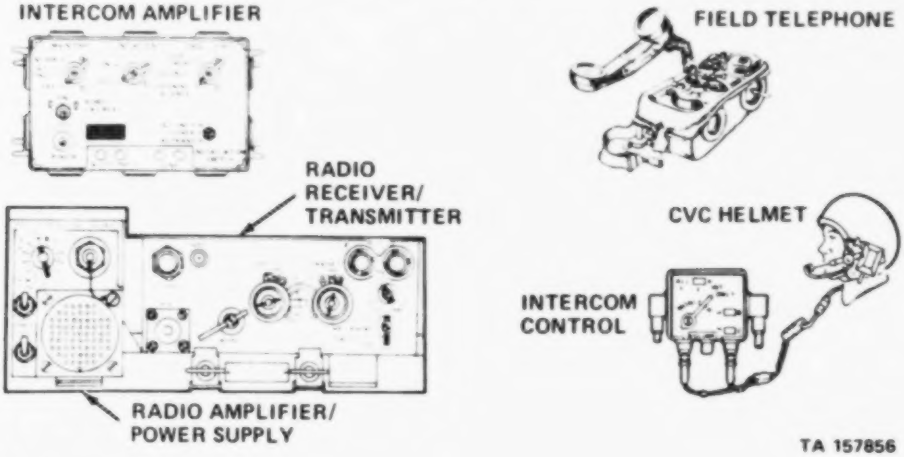
The infrared lights, one on each side in the headlight cluster, operate in conjunction with the IR periscope. They are turned on to illuminate the area with infrared light when picture quality is low.

COMMUNICATIONS

Communication between crew members and external stations is provided by the AN/GRC-160 or the AN/VRC-64 radio sets with intercom. These radios operate in the 30–75.95 MHz band and have a planning range of 8–12 km.

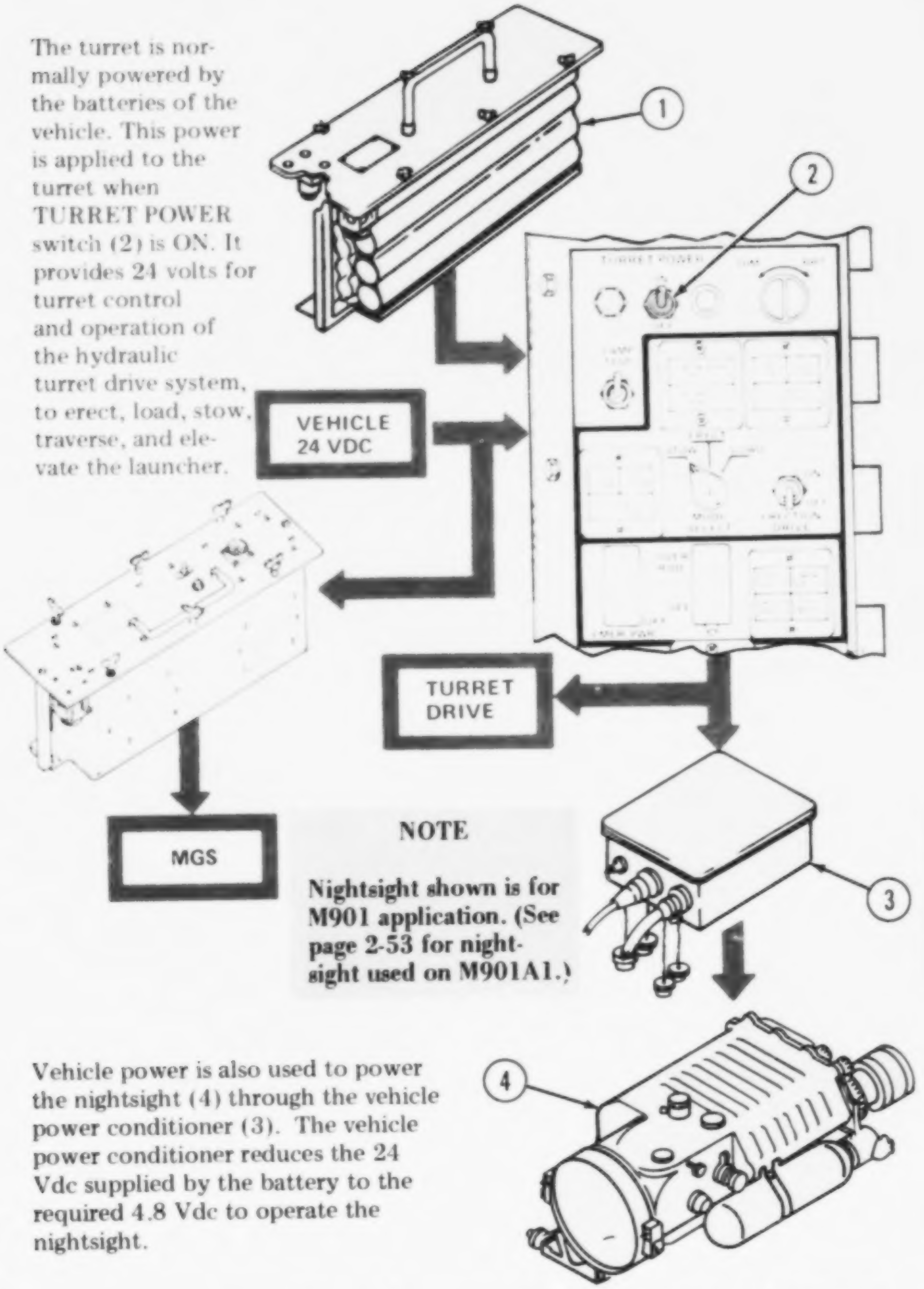
Field Telephone Set TA-312/PT or TA-1/PT with reel and wire ties into the communication system for communication over short distances.

MAJOR COMPONENTS OF COMMUNICATIONS SYSTEM


INTERCOM AMPLIFIER
FIELD TELEPHONE
RADIO RECEIVER/ TRANSMITTER
CVC HELMET
INTERCOM CONTROL
RADIO AMPLIFIER/ POWER SUPPLY
TA 157856

TURRET POWER

The turret is normally powered by the batteries of the vehicle. This power is applied to the turret when TURRET POWER switch (2) is ON. It provides 24 volts for turret control and operation of the hydraulic turret drive system, to erect, load, stow, traverse, and elevate the launcher.



NOTE

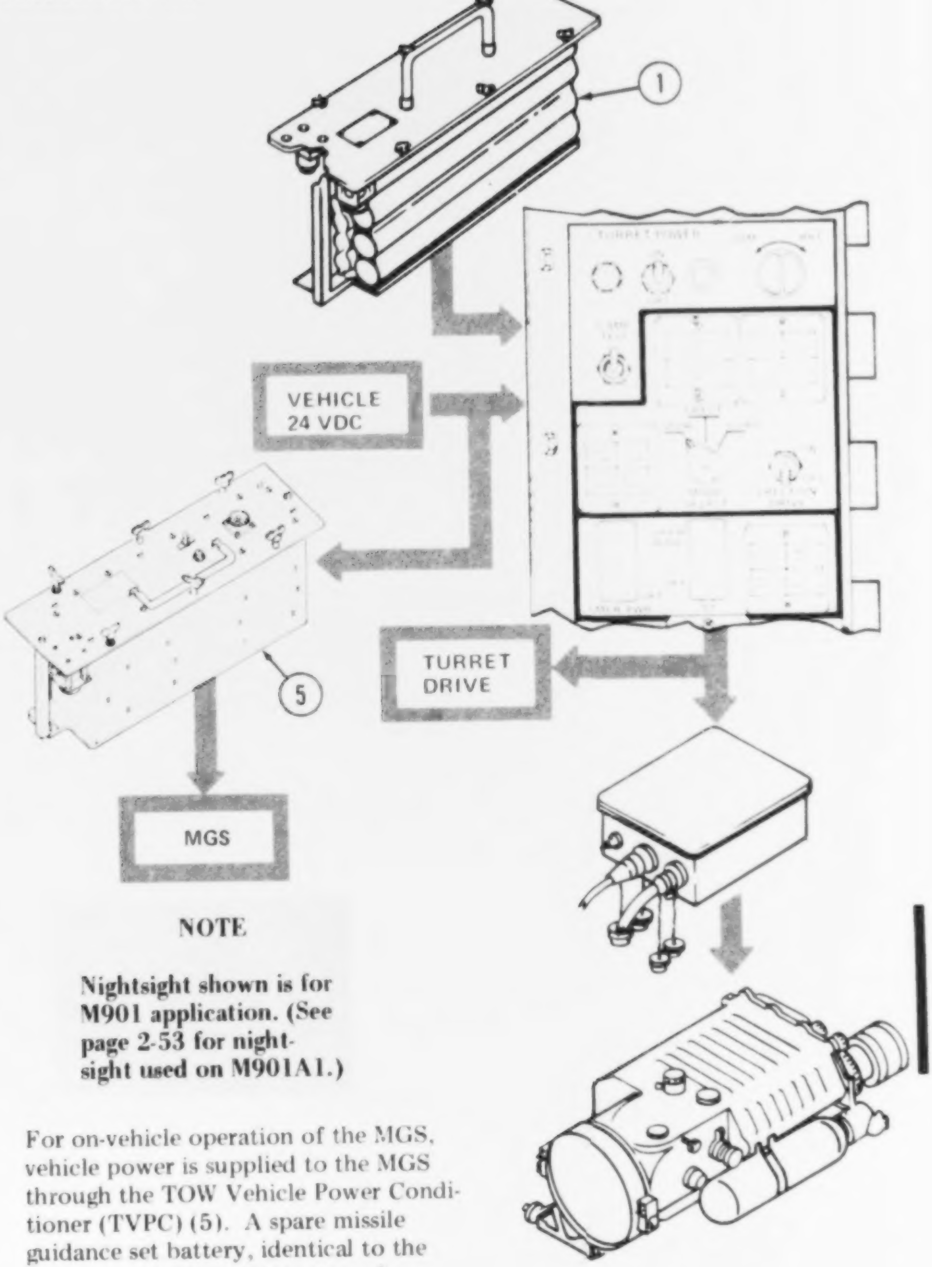
Nightsight shown is for M901 application. (See page 2-53 for nightsight used on M901A1.)

Vehicle power is also used to power the nightsight (4) through the vehicle power conditioner (3). The vehicle power conditioner reduces the 24 Vdc supplied by the battery to the required 4.8 Vdc to operate the nightsight.

The emergency battery (1) supplies power to the turret when vehicle power is not available. It performs most of the functions of the vehicle batteries when used with the manual hydraulic backup system.

TA 159135

TURRET POWER



NOTE

Nightsight shown is for M901 application. (See page 2-53 for night-sight used on M901A1.)

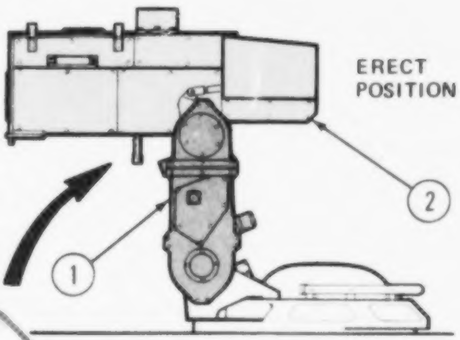
For on-vehicle operation of the MGS, vehicle power is supplied to the MGS through the TOW Vehicle Power Conditioner (TVPC) (5). A spare missile guidance set battery, identical to the emergency battery (1), is stowed on the left sponson. This battery powers a ground-employed MGS and also serves as a back-up for an inoperable TVPC.

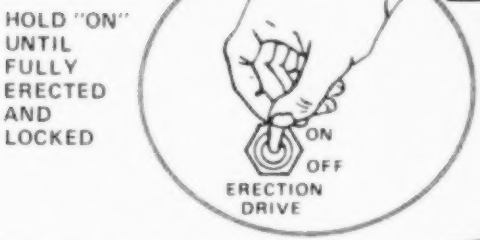
TA 159136

LAUNCHER ERECTION FROM STOW POSITION

CAUTION

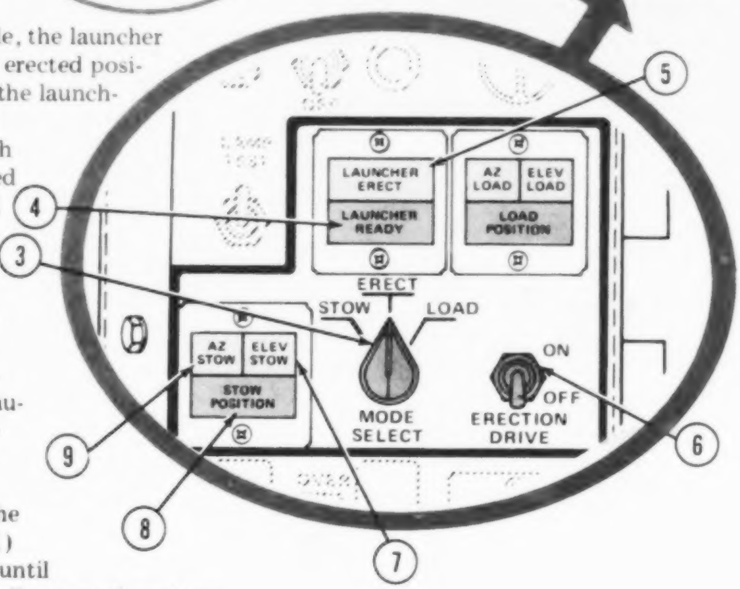
To avoid damaging the erection drive gear shaft teeth and bearings due to improper alinement, do not operate the erection drive with the left erection arm cover removed.


ERECT POSITION
2
1


HOLD "ON" UNTIL FULLY ERECTED AND LOCKED
ON
OFF
ERECTION DRIVE

HYDRAULIC SYSTEM

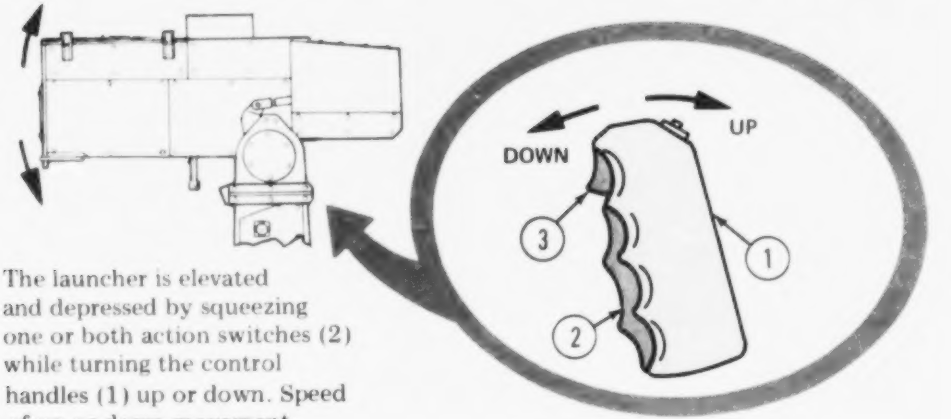
To fire a missile, the launcher must be in the erected position. To erect the launcher, the MODE SELECT switch (3) is positioned to ERECT and the spring-loaded ERECTION DRIVE switch (6) is held to ON. When this happens, hydraulic power is applied to the erection arm drive motor. The erection arm (1) moves upward until it reaches the fully erected position.


5
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
4
3
ERECT
STOW
LOAD
AZ STOW
ELEV STOW
STOW POSITION
MODE SELECT
ON
OFF
ERECTION DRIVE
9
6
8
7

When the launcher is in the stowed position and turret power has been turned on, the STOW POSITION (8), AZ STOW (9), and ELEV STOW (7) lights will be on. During erection the STOW POSITION light goes out. After the launcher (2) has reached fully erected position, a switch in the launcher is tripped, and the LAUNCHER ERECT indicator (5) lights. When the erection arm is locked in position, the LAUNCHER READY indicator (4) will also light. The launcher is now ready to be moved in azimuth and elevation.

TA 158942

ELEVATION MOVEMENT OF LAUNCHER

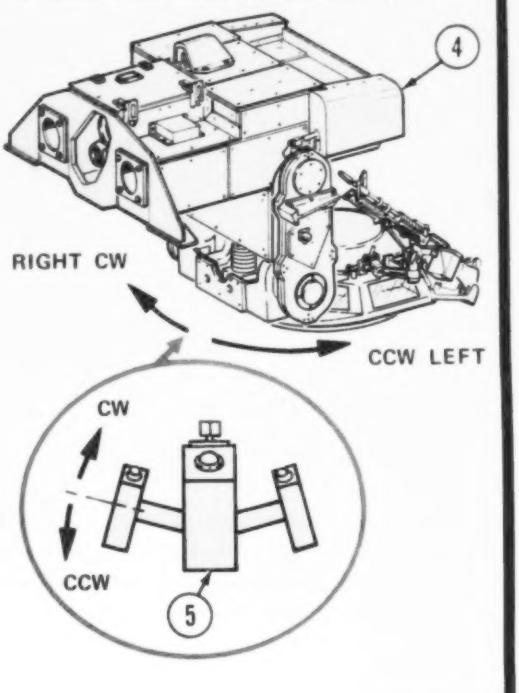


The launcher is elevated and depressed by squeezing one or both action switches (2) while turning the control handles (1) up or down. Speed of up or down movement depends on the amount of displacement of the handles.

AZIMUTH MOVEMENT OF TURRET

The turret (4) is turned clockwise by squeezing one or both action switches (2) while turning the hand controls (5) clockwise. Turning the hand controls counterclockwise while squeezing one or both action switches causes the turret to move counterclockwise. The more the handles are turned, the faster the turret moves. The turret may be moved in both azimuth and elevation by turning the control handles in both azimuth and elevation at the same time. This will cause a slight reduction in speed.

The turret may be moved more rapidly in azimuth (slewed) by pressing either or both action switches (2) and slew switches (3) on the control handles (1) while turning the handles. This increases the speed of rotation four times.

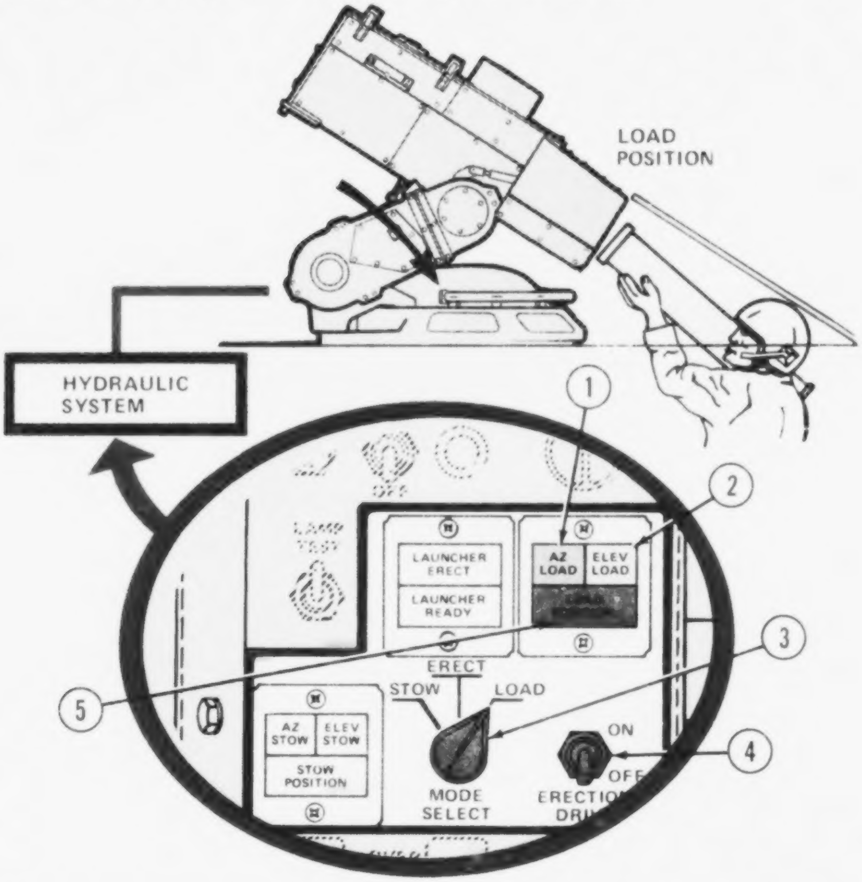


NOTE

The turret cannot be slewed by squeezing the slew switch unless one of the action switches is squeezed at the same time. The slew switch does not affect the movement of the launcher in elevation.

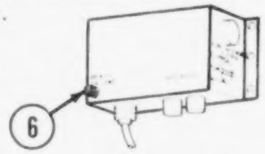
TA 157859

MOVEMENT OF LAUNCHER FOR MISSILE LOADING


LOAD
POSITION
HYDRAULIC
SYSTEM
1
2
3
4
5
LAMP
TEST
OFF
LAUNCHER
ERECT
LAUNCHER
READY
AZ
LOAD
ELEV
LOAD
ERECT
STOW
LOAD
AZ
STOW
ELEV
STOW
STOW
POSITION
MODE
SELECT
ON
OFF
ERECTIO
DR

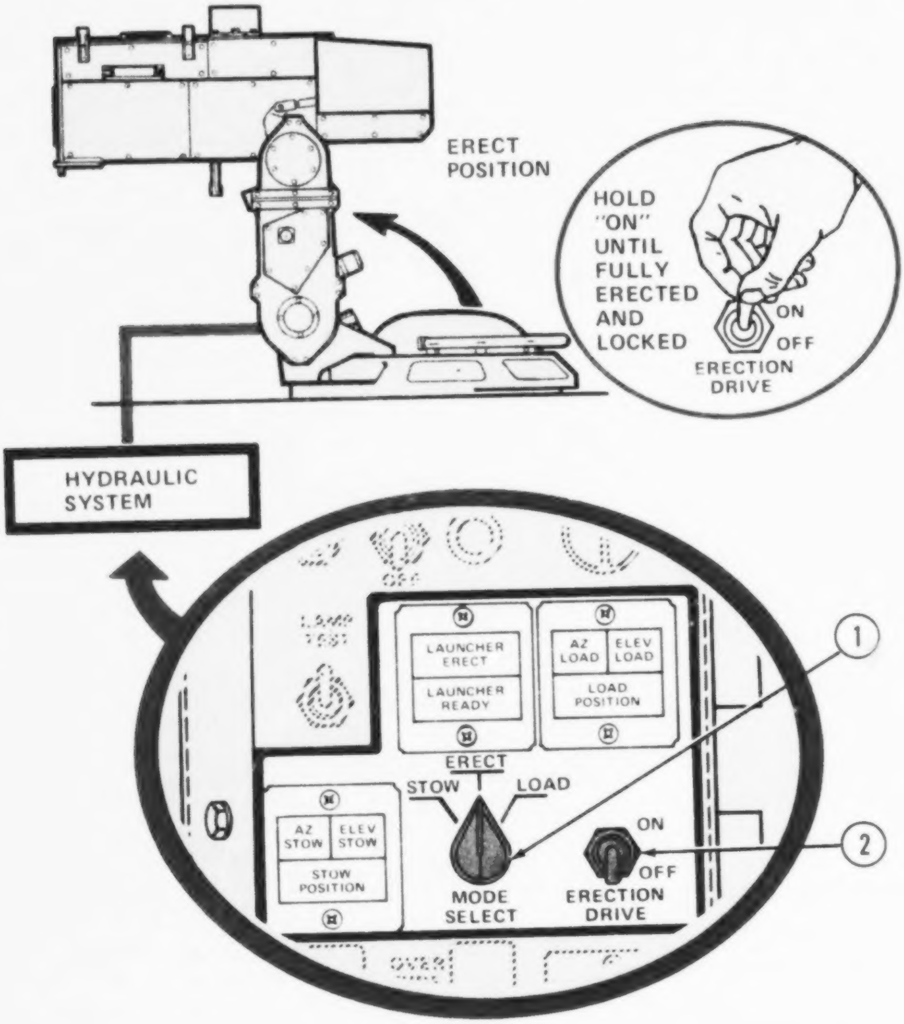
Missiles are loaded into the launcher from inside the vehicle through the partially open cargo hatch. To accomplish this, the launcher must be placed in the load position.

To place the launcher in the load position, it must first be traversed to 0 degrees in azimuth and elevated to +35 degrees. Both the AZ LOAD (1) and ELEV LOAD (2) lights should be on. The MODE SELECT switch (3) is then turned to LOAD and the ERECTION DRIVE switch (4) is held ON until the launcher is in the load position and the LOAD POSITION light (5) comes on. The LAUNCHER READY light will go off as soon as the MODE SELECT switch is set to LOAD. The LAUNCHER ERECT light will go off as soon as the launcher starts to come down from the erected position. A READY TO LOAD light (6) on the fire interrupt/intercom assembly also comes on, indicating to the loader that the launcher is in the proper position for loading missiles.



TA 157860

ERECTION FROM LOAD POSITION

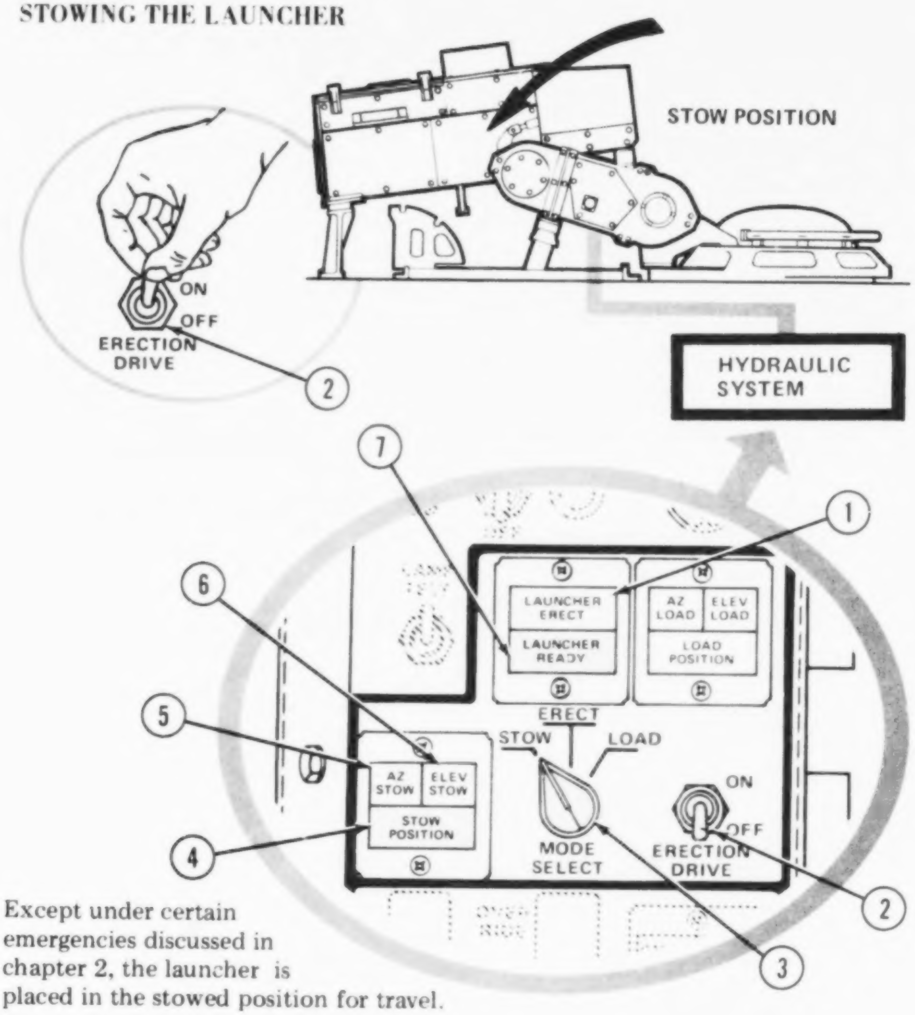

ERECT POSITION
HOLD "ON" UNTIL FULLY ERECTED AND LOCKED
ON
OFF
ERECTION DRIVE
HYDRAULIC SYSTEM
LAMP TEST
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
ERECT
STOW
LOAD
AZ STOW
ELEV STOW
STOW POSITION
MODE SELECT
ON
OFF
ERECTION DRIVE
1
2

The launcher is erected from the load position as follows:

The MODE SELECT switch (1) is placed to ERECT and the ERECTION DRIVE switch (2) is held to ON. Hydraulic power is then applied, causing the erection arm to raise to the erect position, ready for action. The turret may then be moved in azimuth and elevation by using the hand controls.

TA 070755

STOWING THE LAUNCHER


STOW POSITION
ON
OFF
ERECTION DRIVE
2
HYDRAULIC SYSTEM
7
1
6
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
5
ERECT
STOW
LOAD
AZ STOW
ELEV STOW
STOW POSITION
4
MODE SELECT
ON
OFF
ERECTION DRIVE
2
3

Except under certain emergencies discussed in chapter 2, the launcher is placed in the stowed position for travel.

To place the launcher in the stowed position it must first be traversed to 180 degrees in azimuth, elevated to maximum elevation, then depressed to −5 degrees with the hand controls. Both the AZ STOW (5) and the ELEV STOW (6) lights should be on.

NOTE

To light ELEV STOW light (6), the launcher should always be positioned to maximum elevation and moved down.

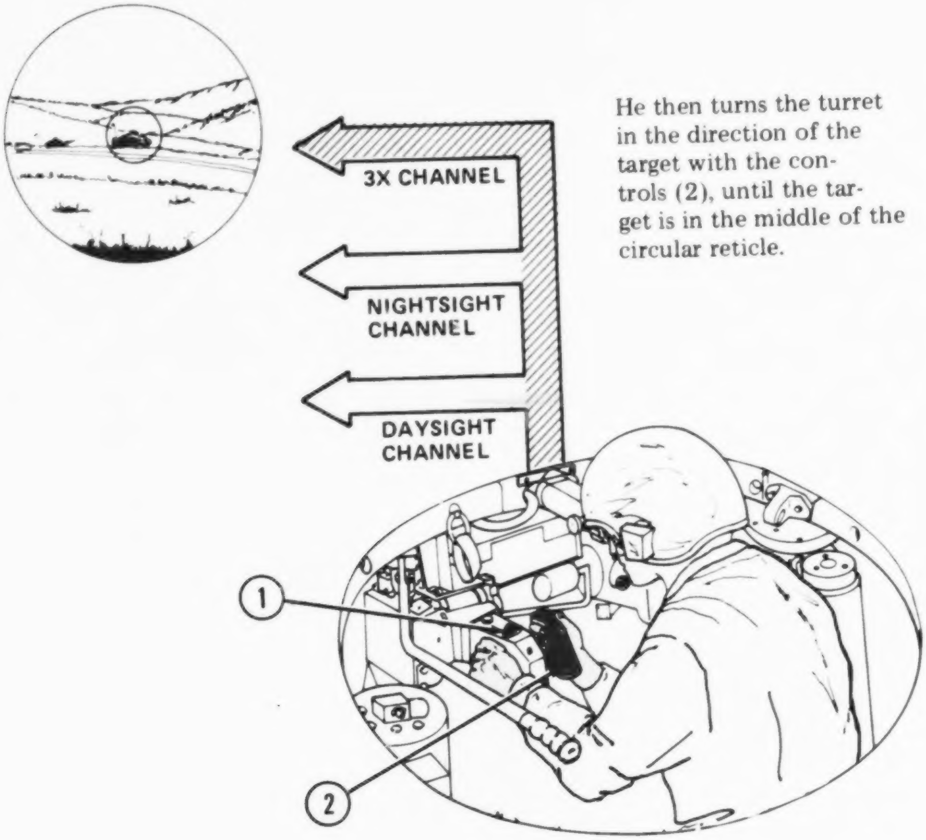
The MODE SELECT switch (3) is then turned to STOW and the ERECTION DRIVE switch (2) is held to ON until the launcher is in the stowed position and the STOW POSITION lamp (4) lights.

The LAUNCHER ERECT (1) and the LAUNCHER READY (7) lights will go off as soon as the launcher starts to come down from the erected position.

TA 157861

ACQUIRING THE TARGET DURING DAYLIGHT HOURS.

During daylight hours the gunner acquires the target by turning the sight select switch (1) to 3X. This places the 3X wide field-of-view telescope in the viewing channel and allows him to see a big area thru the ITA eyepiece.

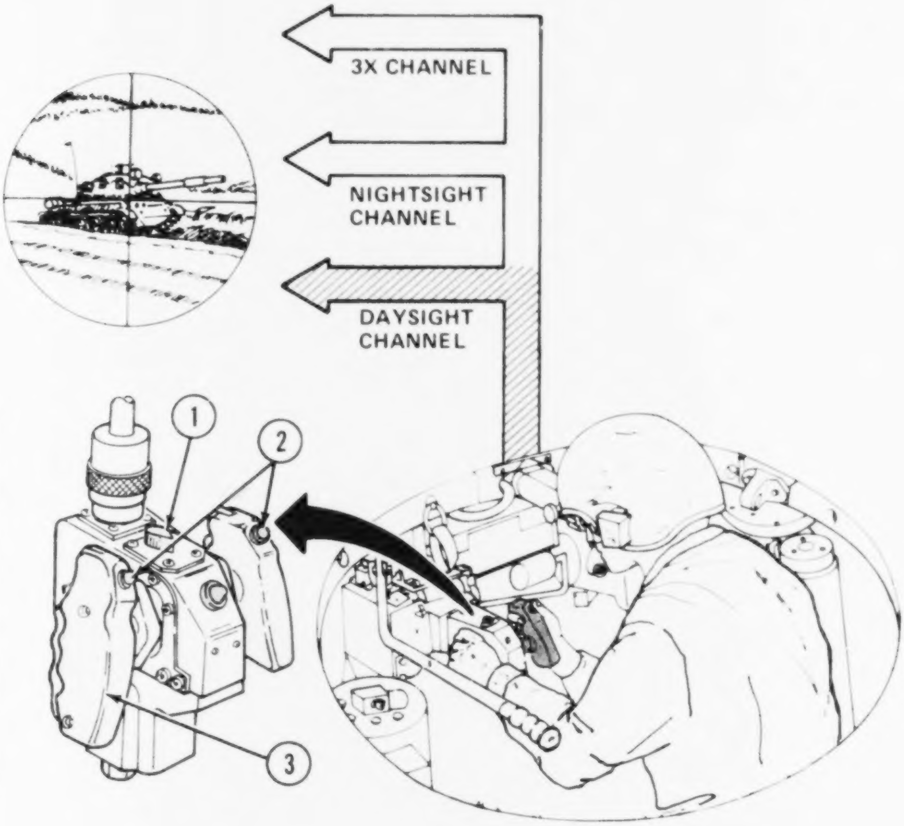

3X CHANNEL
NIGHTSIGHT CHANNEL
DAYSIGHT CHANNEL
1
2

He then turns the turret in the direction of the target with the controls (2), until the target is in the middle of the circular reticle.

TA 070757

TRACKING AND FIRING DURING DAYLIGHT HOURS

When target image is approximately centered in the circular reticle (for daylight firing) the gunner turns the sight select switch (1) from 3X to 13X. He now sees the target through the daysight/tracker in the daysight channel.

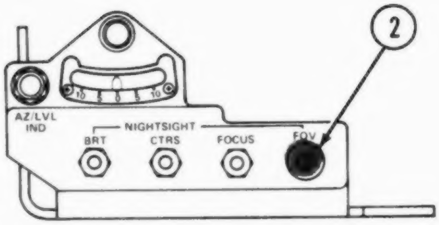


The target is magnified 13 times, but the field-of-view has been reduced to 5.5 degrees. The gunner places the crosshairs of the daysight/tracker on the most vulnerable part of the target and fires by pressing one or both trigger switches (2) on the control handle (3).

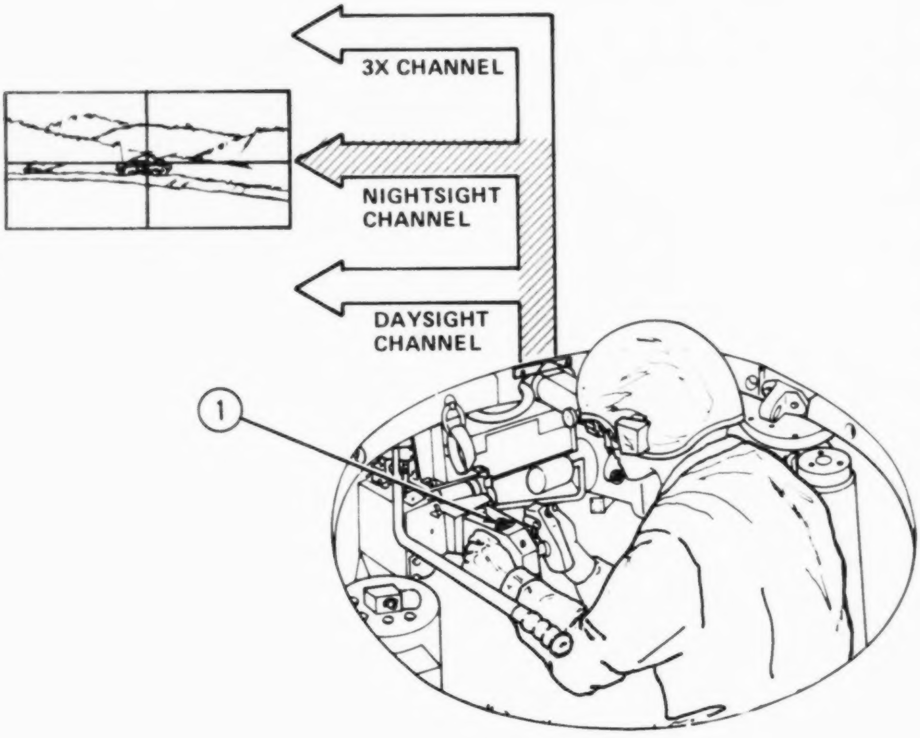
TA 157862

ACQUIRING THE TARGET AT NIGHT

At night and during the day when visibility is poor, the gunner acquires the target by turning the sight select switch (1) to NIGHT and pushing the FOV (field-of-view) selector (2) all the way in.


2
10 5 0 5 10
AZ/LVL IND
NIGHTSIGHT
BRT
CTRS
FOCUS
FOV

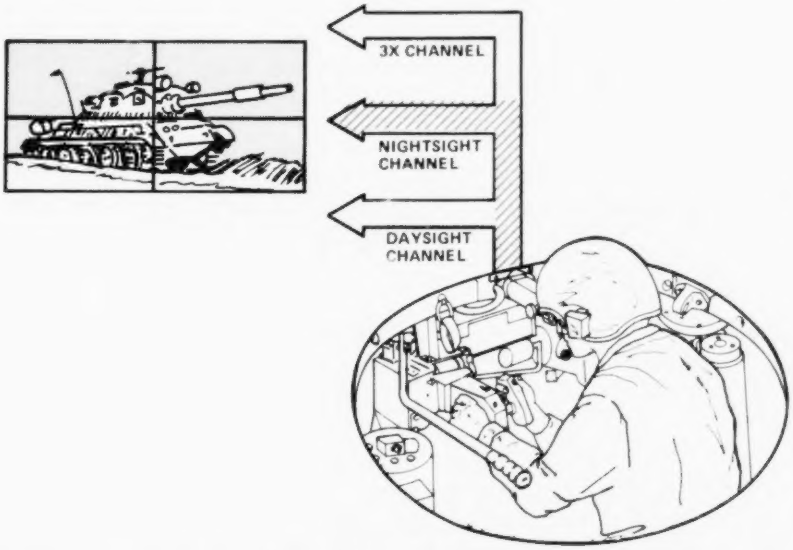
The gunner now sees the target through the nightsight channel in the wide field-of-view mode. The crosshairs and the rectangular sight picture are illuminated.


3X CHANNEL
NIGHTSIGHT CHANNEL
DAYSIGHT CHANNEL
1

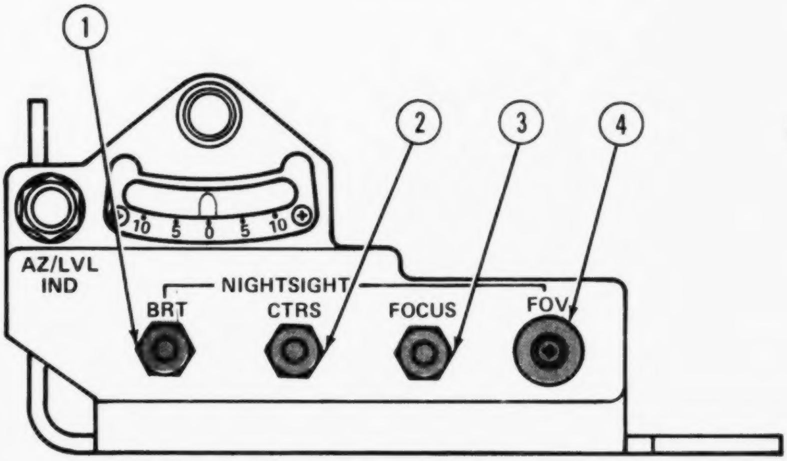
TA 070759

TRACKING AND FIRING AT NIGHT

When firing at night the gunner leaves the sight select switch on NIGHT, but pulls the FOV selector (4) out as far as it will go to select the narrow field-of-view channel within the nightsight, giving him a close up picture of the target.


3X CHANNEL
NIGHTSIGHT CHANNEL
DAYSIGHT CHANNEL

He then operates the BRT (1) (brightness), CTRS (2) (contrast), and range FOCUS (3) controls to get the best possible target image. He fires when the target is positively identified as foe and is within range.


1
2
3
4
10 5 0 5 10
AZ/LVL IND
NIGHTSIGHT
BRT
CTRS
FOCUS
FOV

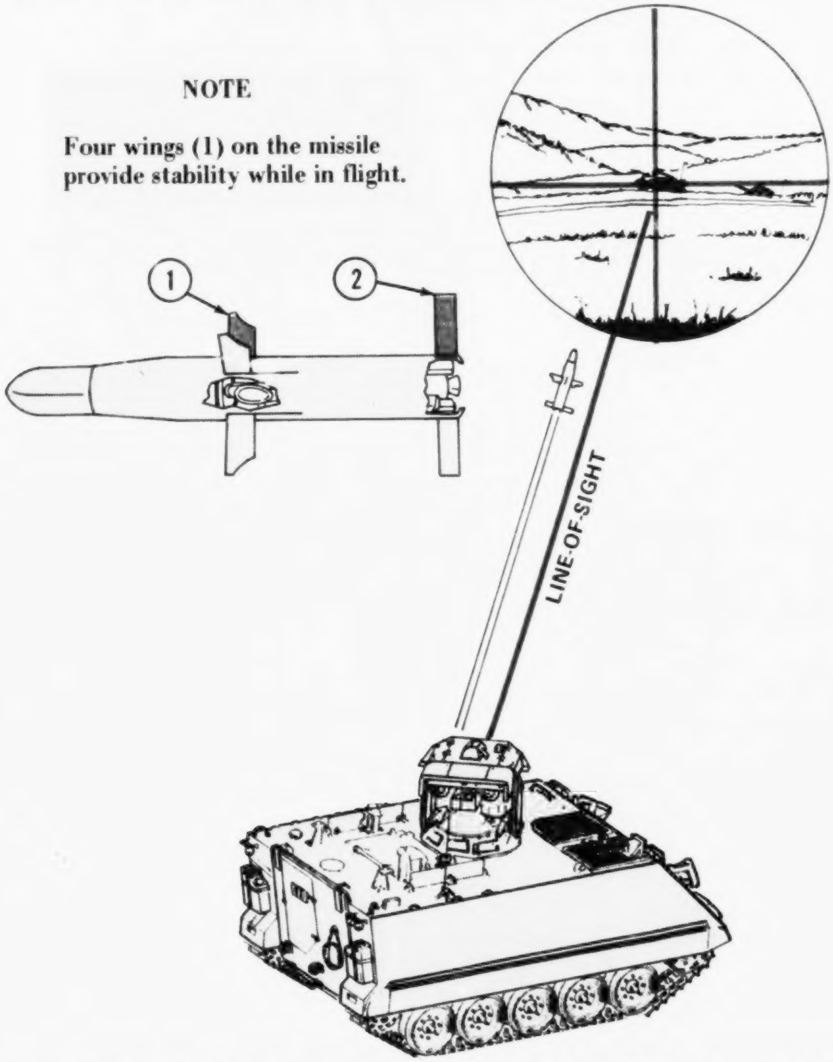
TA 070760

MISSILE FLIGHT

The missile is guided by the electrical signals sent to it thru the guidance wires which are fed out the aft end of the missile while in flight. These signals rotate the four control surfaces (2) on the back of the missile to tilt the missile up or down or to turn it left or right as needed.

NOTE

Four wings (1) on the missile provide stability while in flight.



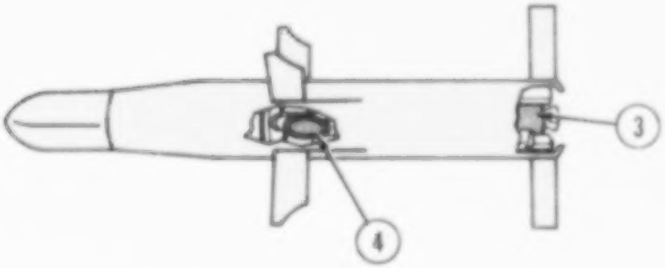
On the M901 vehicle, the signals are developed in the MGS from inputs of the daysight/tracker which compare the flight path of the missile with the line-of-sight to the target throughout the flight.

On the M901A1 vehicle, the missile is tracked by both the daysight/tracker and the AN/TAS-4A nightsight. The tracking capability of the AN/TAS-4A nightsight provides for greater accuracy when firing missiles through dense smoke and fog.

TA 159137

MISSILE FLIGHT

The missile has two rocket motors, the launch motor (3) and the flight motor (4). The smaller launch motor puts out just enough thrust to eject the missile out of the launch tube. The larger flight motor fires a fraction of a second later and gives the missile enough boost to get it to the target.



NOTE

Because the missile is guided in flight, it is very important that the target be tracked (crosshairs kept on target) until the target is hit or the gunner is sure that he missed.

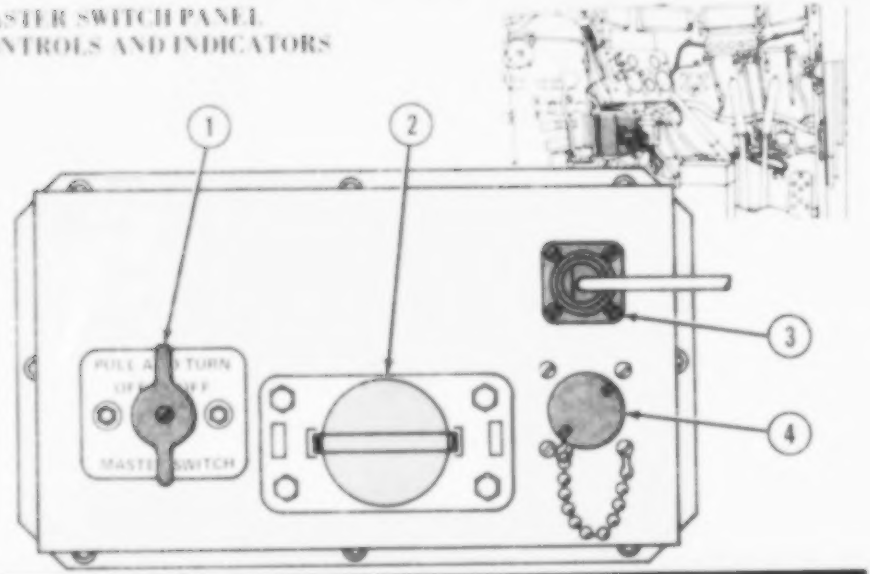
TA 070762

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

This section describes, locates, and illustrates the controls and instruments of the M901/M901A1 vehicle. The location and function of all controls must be learned before operating the vehicle or components of the vehicle. To find a specific control, refer to the alphabetical index.

MASTER SWITCH PANEL CONTROLS AND INDICATORS



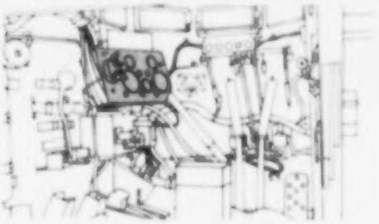
Key	Control or Indicator	Function
1	MASTER SWITCH M901/M901A1 **CAUTION** **To prevent damage to turret electrical circuit, make sure TURRET POWER switch is OFF before turning the MASTER SWITCH ON.**	Used to turn all electrical power in the vehicle on or off (except on later vehicles with M113A1 chassis and all vehicles with M113A2 chassis that have heater circuits wired directly to battery). To turn power on, pull switch out and turn to ON position. Pull switch out and turn to OFF to cut off the power. Heater circuit is wired directly to batteries on later vehicles with M113A1 chassis and on all vehicles with M113A2 chassis.
2	Auxiliary Power Receptacle	24-Vdc power receptacle. Used to jump start vehicles.

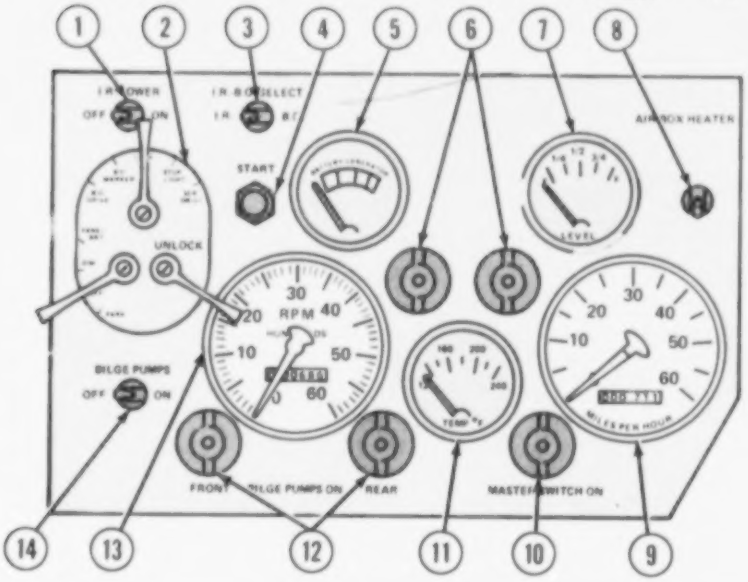
TA 159138

MASTER SWITCH PANEL CONTROLS AND INDICATORS

Key	Control or Indicator	Function
3	Infrared Stowage Receptacle	Stows M19 periscope power cable when periscope is not in use.
4	Utility Outlet	Provides power for 24-volt accessories from vehicle electrical system. Has protective cap which is removed prior to connecting 24-volt accessory cable.

DRIVER'S CONTROL PANEL CONTROLS AND INDICATORS

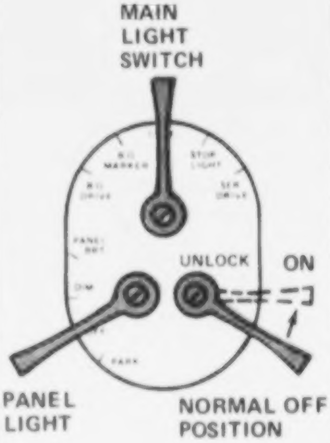



1
2
3
4
5
6
7
8
I.R. POWER
OFF
ON
I.R.-B.O. SELECT
I.R.
B.O.
START
UNLOCK
AIRBOX HEATER
LEVEL
30
20
RPM
40
10
50
60
HUNDREDS
TEMP °F
MILES PER HOUR
BILGE PUMPS
OFF
ON
FRONT
BILGE PUMPS ON
REAR
MASTER SWITCH ON
14
13
12
11
10
9

Key	Control or Indicator	Function
1	I.R. POWER Switch	When in ON position, applies power to infrared M19 periscope.

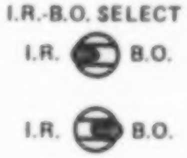
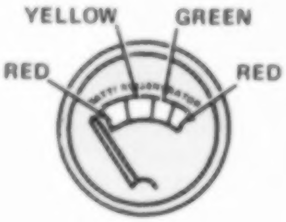
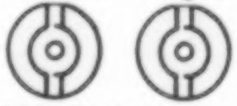
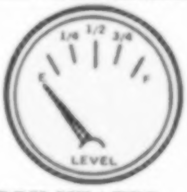
TA 070764

DRIVER'S CONTROL PANEL CONTROLS AND INDICATORS

Key	Control or Indicator	Function
2	Light Switch Assembly  MAIN LIGHT SWITCH B.O. MARKER STOP LIGHT B.O. DRIVE SER. DRIVE PANEL BRT UNLOCK ON DIM PARK PANEL LIGHT NORMAL OFF POSITION	Main light switch (top switch) controls exterior lights as follows: B.O. DRIVE position—Blackout drive, blackout taillight, and blackout marker lights are on. B.O. MARKER position—Blackout marker lights only are on. OFF position—All driving lights are off. STOPLIGHT position—Stoplight circuit is energized. Stoplight comes on when steering levers are pulled back with switch on. SER. DRIVE position—Service drive lights and taillights are on. Stoplight circuit is energized. Panel light switch (lower left) controls panel lights as follows: PANEL BRT. position—Panel lights are brightly lit. DIM position—Panel lights are dimly lit. OFF position—Panel lights are off. PARK position—Not connected or used. Unlock switch (lower right) is used with main light switch to select a desired set of lights for operation as follows: Normal position—While in this spring-loaded position, B.O. DRIVE, STOPLIGHT, and SER. DRIVE on the main light switch cannot be turned on. UNLOCK position—When held in this position, main light switch can be moved to any position.

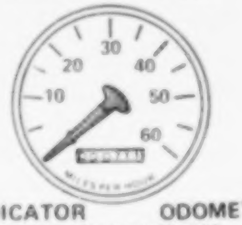
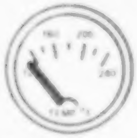
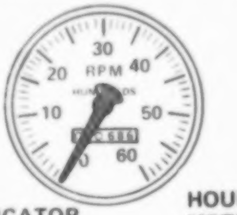
TA 070765

DRIVER'S CONTROL PANEL CONTROLS AND INDICATORS

Key	Control or Indicator	Function
3	I.R.-B.O. SELECT Switch 	Used with IR periscope as follows: I.R. Position—With I.R.—B.O. SELECT switch in this position, main light switch in B.O. DRIVE, and I.R. POWER switch ON, only the infrared lights are on. B.O.—When switch is in this position, the main light switch functions normally as described in 2.
4	START Switch PUSH TO START	Push button switch. Starts engine when pressed if MASTER SWITCH is ON.
5	BATTERY GENERATOR Indicator 	Indicates battery and generator voltage as follows: RED—Low voltage YELLOW—Intermediate voltage GREEN—Operating voltage, 24 Vdc RED—Excessive voltage NOTE **Battery voltage is not an indication of battery charge condition unless voltage is checked while load is being applied.**
6	Instrument Panel Lights 	On when panel light switch is in any position except OFF.
7	Fuel LEVEL Indicator 	Indicates levels of fuel tank: empty (E), 1/4, 1/2, 3/4, or full (F).
8	AIR BOX HEATER Switch 	Used to preheat engine air box to aid in starting engine in cold weather. Switch is spring-loaded in off position.

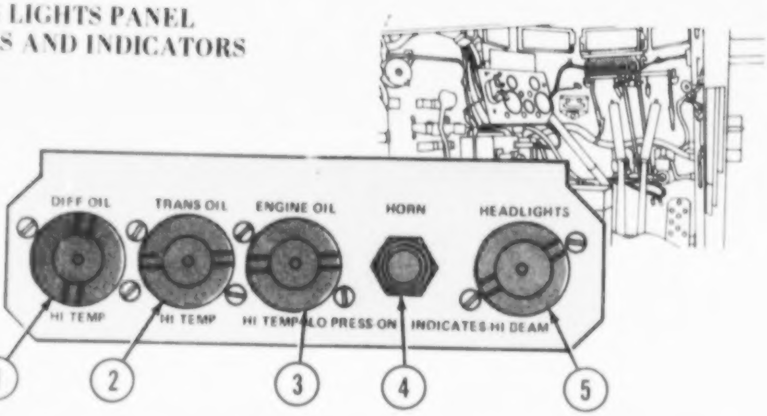
TA 070766

DRIVER'S CONTROL PANEL CONTROLS AND INDICATORS

Key	Control or Indicator	Function
9	MILES PER HOUR Speedometer Odometer  10 20 30 40 50 60 MILES PER HOUR INDICATOR ODOMETER	Indicates speed in miles per hour. Odometer indicates accumulated mileage.
10	MASTER SWITCH ON Indicator Light 	Lights when MASTER SWITCH is turned ON.
11	TEMP °F Gage  TEMP °F INDICATOR	Engine coolant temperature indicator indicates temperature in Fahrenheit degrees. **CAUTION** **If engine temperature stays above 230°F, stop engine and check coolant level.**
12	BILGE PUMPS ON Indicator Lights 	Two indicators, FRONT and REAR. When on, indicate that bilge pumps are operating.
13	R.P.M. Meter (Tachometer)  10 20 30 40 50 60 RPM INDICATOR HOUR METER	Indicates speed of engine in revolutions per minute (rpm). To read rpm, multiply dial speed by 100. The engine hour meter on the lower part of the dial indicates total hours of engine operation.
14	BILGE PUMPS Switch 	Turns bilge pumps on and off.

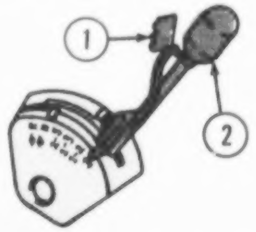
TA 070767

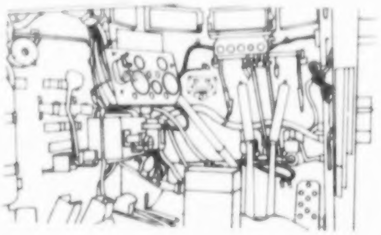
WARNING LIGHTS PANEL CONTROLS AND INDICATORS


DIFF OIL
TRANS OIL
ENGINE OIL
HORN
HEADLIGHTS
HI TEMP
HI TEMP
HI TEMP
LO PRESS ON
INDICATES HI BEAM
1
2
3
4
5

Key	Control or Indicator	Function
1	DIFF (Differential) OIL Indicator	Lights when oil in differential is too hot.
2	TRANS (Transmission) OIL Indicator	Lights when transmission oil is too hot.
3	ENGINE OIL Indicator	Lights when engine oil is low or too hot. Also when engine is off and MASTER SWITCH is ON.
4	HORN Switch	Push button switch used to blow the horn.
5	HEADLIGHTS Indicator	Lights when headlights are on high beam.

TRANSMISSION RANGE SELECTOR AND SHIFT CONTROLS

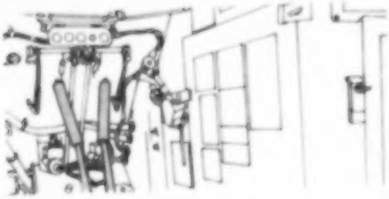


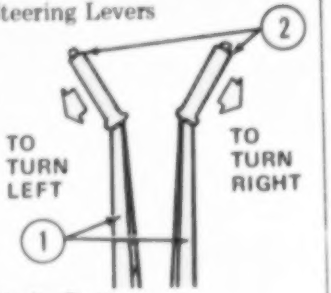
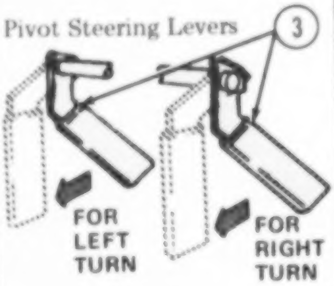


Key	Control or Indicator	Function
1	Detent	Prevents accidental shifting.
2	Shift Lever	Used to select any one of the four forward and one reverse driving ranges.

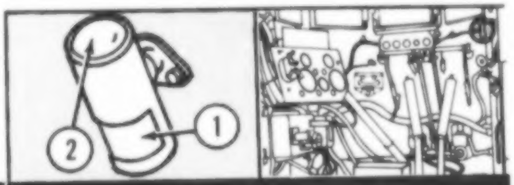
TA 070768

STEERING AND BRAKING CONTROLS



Key	Control or Indicator	Function
1	Differential Steering Levers  	Used to steer vehicle at normal driving speeds. Pulling back on left lever turns the vehicle left, pulling back on right lever turns it right. Pull back both levers to slow vehicle down or stop.
2	Brake Buttons	Buttons are pressed to lock brakes with steering levers pulled back.
3	Pivot Steering Levers  	Used for short radius turns and quick stops. Pulling back the left lever turns vehicle left. Pulling back the right lever turns it right. For quick stops pull back both levers. Pivot steering is also used in water.

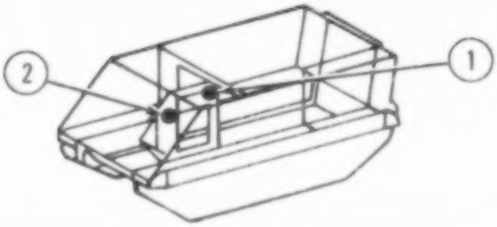
AIR CLEANER RESTRICTION INDICATOR CONTROLS AND INDICATORS

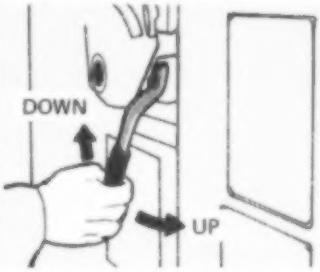
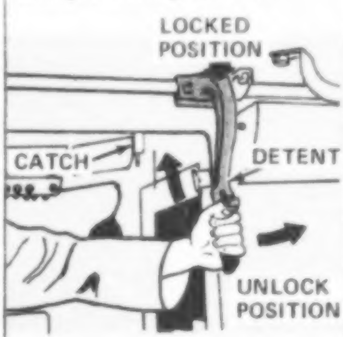


Key	Control or Indicator	Function
1	Window	Indicates air cleaner element is ok for operation if green. When window is all red, element is clogged and must be cleaned.
2	Press to Test Button	Button is pressed when a reading is desired.

TA 070769

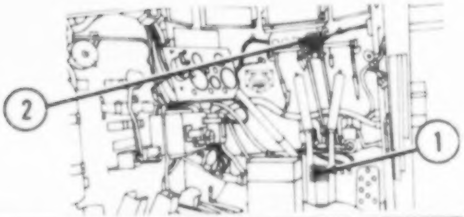
RAMP CONTROLS

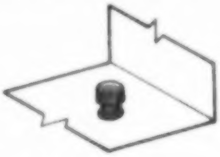
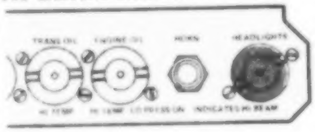


Key	Control or Indicator	Function
1	Ramp Actuating Lever 	The ramp actuating lever is located on the engine compartment bulkhead to the right of the driver. The lever is used to raise and lower the ramp. To raise the ramp, pull the lever back toward the rear of the vehicle. To lower the ramp, push the lever toward the front of the vehicle. The lever is spring-loaded in the neutral position.
2	Ramp Locking Handle 	The ramp locking handle is located behind the driver on the right side near the personnel compartment ventilator. It locks the ramp in raised position. To unlock, prior to lowering ramp, push in on detent to disengage the handle from the catch and push the handle to the rear as far as it will go. After ramp has been lowered, return handle to locked position. To lock ramp pull down on handle and push toward rear of vehicle as far as it will go. After ramp is raised push handle upward toward front of vehicle until it locks in ceiling catch.

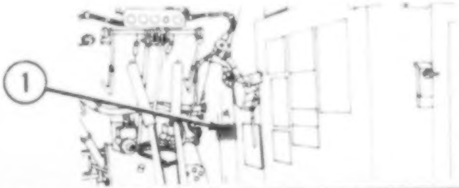
TA 070770

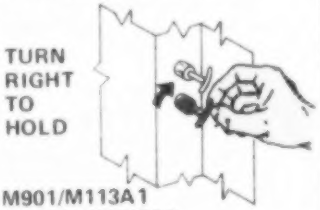
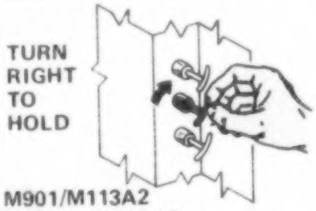
HEADLIGHT BEAM CONTROLS AND INDICATORS



Key	Control or Indicator	Function
1	Beam Selecting Switch 	The beam selecting switch is used to switch the headlights from high to low beam or from low to high beam. The beam will switch each time the switch is pressed and released.
2	HI BEAM Indicator  TRANS OIL ENGINE OIL HORN HEADLIGHTS HI TEMP HI TEMP LO PRESS ON INDICATES HI BEAM	Lights when headlights are switched to high beam.

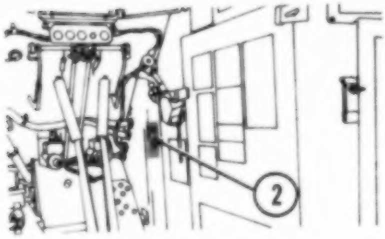
FUEL CUTOFF AND HAND THROTTLE CONTROLS

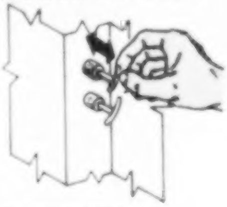
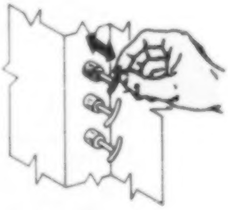


Key	Control or Indicator	Function
1	Hand Throttle Control  TURN RIGHT TO HOLD M901/M113A1 M901A1/M113A1  TURN RIGHT TO HOLD M901/M113A2 M901A1/M113A2	The hand throttle control sets the engine speed at desired rpm. To set the engine speed, press the accelerator pedal and pull out the throttle until the engine reaches the rpm needed, then turn the throttle handle clockwise to hold that setting. To release throttle, turn throttle handle counterclockwise and push handle in.

TA 159139

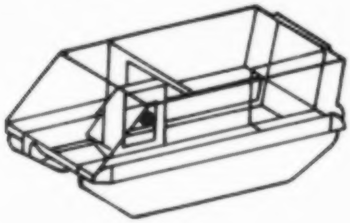
FUEL CUTOFF AND HAND THROTTLE CONTROLS

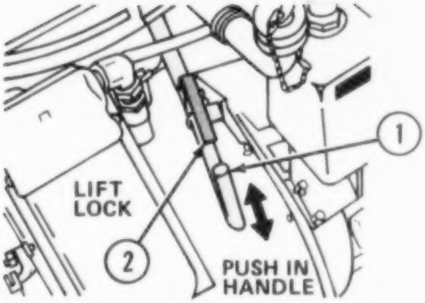


Key	Control or Indicator	Function
2	Fuel Cutoff Control  M901/M113A1 M901A1/M113A1  M901/M113A2 M901A1/M113A2	The fuel cutoff control cuts off the fuel supply and stops the engine. To allow fuel to flow to the engine, push the fuel control all the way in. To cut off fuel when stopping the engine, pull the control all the way out.

TA 159140

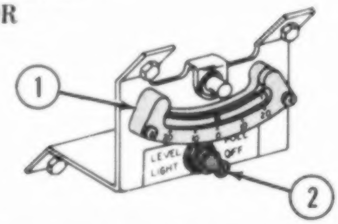
ENGINE DISCONNECT CONTROLS

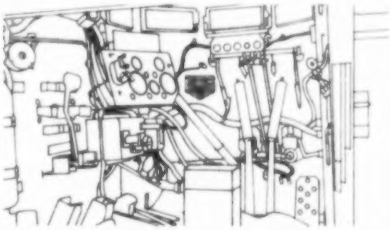




Key	Control or Indicator	Function
1	Disconnect Handle	Allows operator to disconnect engine from gear train for cold starting. Pulling handle out disconnects engine. Pushing handle in reengages engine.
2	Lock	Prevents accidental disengagement of engine. Lift lock to release disconnect handle.

DRIVER'S LEVEL INDICATOR

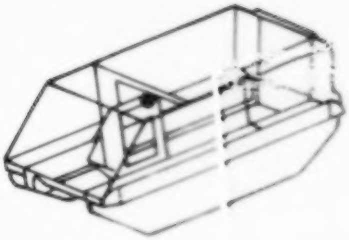




Key	Control or Indicator	Function
1	Degree Scale and Dial	Indicates sideward slope of vehicle up to 20°.
2	Light Switch	Push-pull switch used to turn level light on and off.

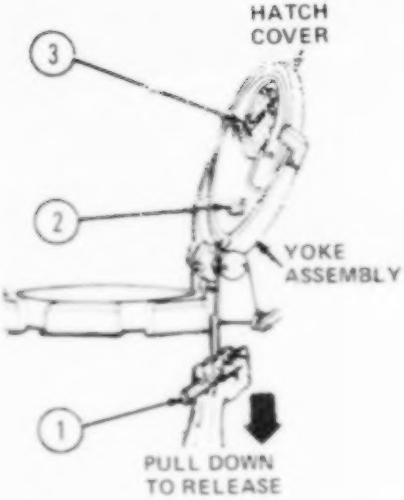
TA 070772

DRIVER'S HATCH CONTROLS



NOTE

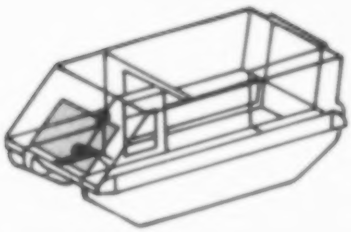
Pop up hatch can be locked in two open positions.

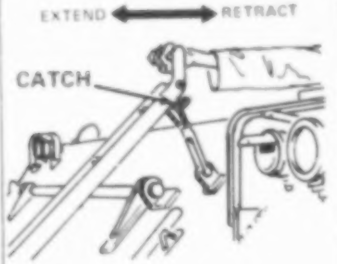
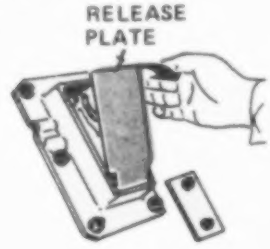
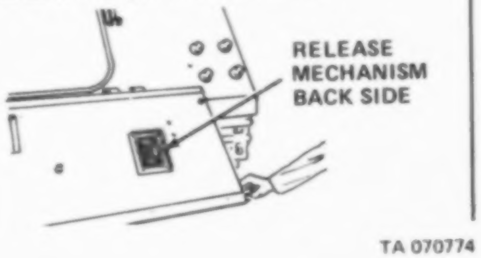


Key	Control or Indicato	Function
1	Hatch Release Handle	When pulled, releases catch to allow driver to close hatch or to raise to the fully open position from the partially open position. **WARNING** **To prevent the hatch cover from rotating while open and injuring the driver or damaging the squad leader's periscope, do not move the locking knob toward the center of the hatch cover unless the hatch is to be closed. When closing the hatch, always hold the hatch cover with hand before moving the locking knob.**
2	Locking Knob	Secures hatch cover to yoke assembly when hatch is open. Pull out and slide toward center to release when hatch is to be fully closed.
3	Latching Handle	Locks hatch cover in closed position.

TA 157866

TRIM VANE CONTROLS



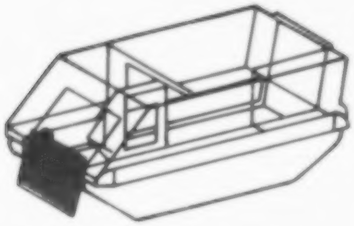
Key	Control or Indicator	Function
	NOTE **The trim vane is a plywood panel attached to the front of the vehicle. It is used during water operation to stabilize the vehicle and is controlled from the driver's hatch.**	
1	Trim Vane Control Handle 	The trim vane control handle extends or retracts the trim vane. To extend, push handle forward until it engages catch. To retract push down on detent while pulling handle back until it locks.
2	Trim Vane Release Mechanism 	To lower vane for access to engine compartment, pull up and out on quick release plate and lower vane gently to the ground, rotating it on its hinges. To reengage, lift vane up from the ground, lift quick release plate and let go. Latching mechanism will automatically engage. Push plate down as far as it will go to secure vane. 

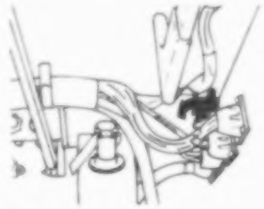
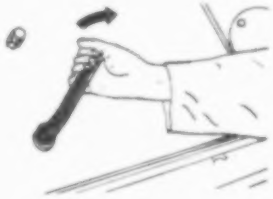
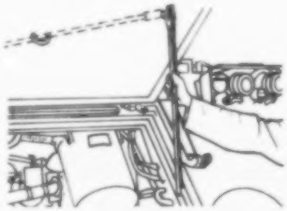
TA 070774

POWER PLANT DOOR CONTROLS

NOTE

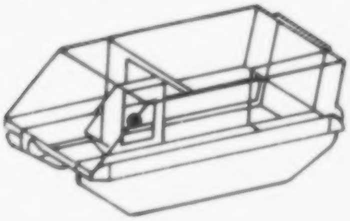
Trim vane must be lowered to gain access to power plant door.

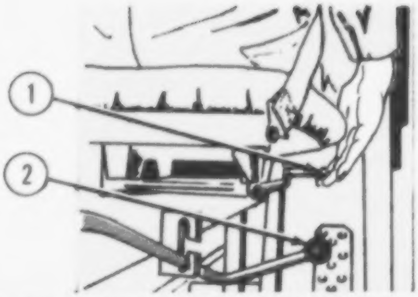


Key	Control or Indicator	Function
1	Power Plant Door Lock Handle 	Operates power plant door lock. To unlock door, turn handle as shown. Handle is located in the right front of the driver's compartment and is shown in the unlocked position (up).
2	Door Handle 	Allows door to be opened and closed if interior lock is released.
3	Hold Open Brace 	Holds door in the open position. When not used, brace folds up and latches to bottom of door.

TA 157867

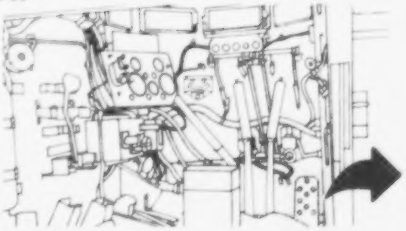
DRIVER'S SEAT CONTROLS

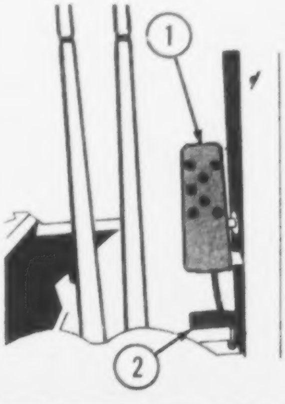




Key	Control or Indicator	Function
1	Horizontal Control Handle	Allows horizontal adjustment of seat. To operate, pull up handle and slide seat forward or rearward as necessary.
2	Vertical Control Handle	Allows vertical adjustment of seat. To raise seat, pull up handle and release weight on seat until seat rises to desired height. Release handle to lock seat in position. To lower seat, pull up handle and apply body weight to seat.

ACCELERATOR PEDALS

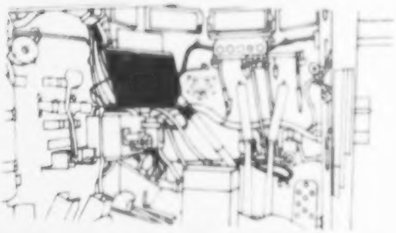


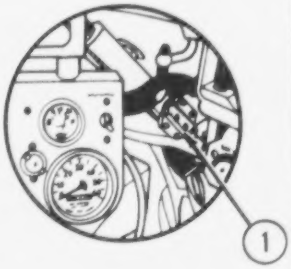
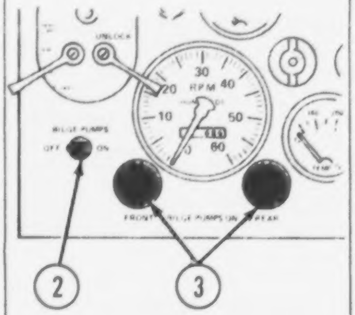


Key	Control or Indicator	Function
1	**Large Pedal**	**Used to control engine speed while driving. Large pedal is for driving with hatch open and raised driver's seat.**
2	**Small Pedal**	**Used to control engine speed while driving with hatch closed.**

TA 070776

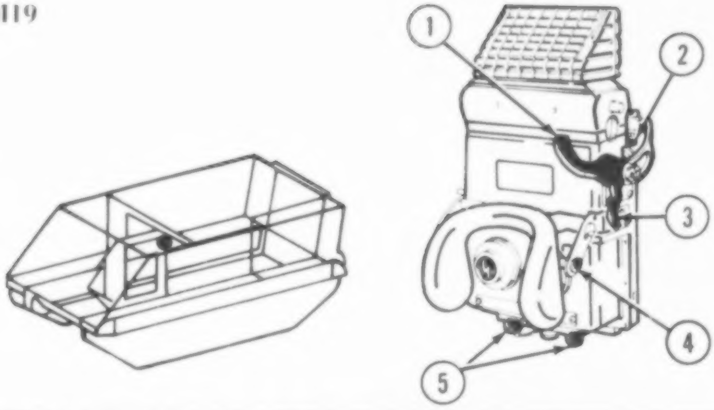
BILGE PUMP CONTROLS AND INDICATORS



Key	Control or Indicator	Function
1	Sight Window 	Indicates when pump is operating and dumping water overboard. When no bubbles are seen in window, with pump running, vehicle is dry and pump should be turned off.
2	BILGE PUMPS ON/OFF Switch  UNLOCK 30 20 RPM 40 10 50 60 BILGE PUMPS OFF ON FRONT BILGE PUMPS ON REAR 2 3	Two-position switch that turns bilge pumps on and off.
3	BILGE PUMPS ON/OFF Indicators	Pump lights are on when pumps are running.

TA 112615

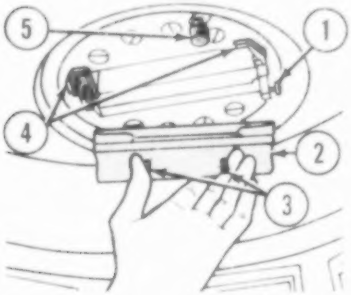
INFRARED (IR) PERISCOPE, M19 CONTROLS

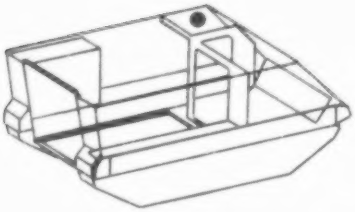


Key	Control or Indicator	Function
	WARNING **The IR periscope operates with extremely high voltages. Follow procedures starting on page 2-117 closely when installing or removing it.**	
1	Elevation Arm	Elevates and depresses the periscope.
2	Arm Adjusting Knob	Makes fine adjustments to the elevation arm.
3	Elevation Locking Lever	Locks periscope in desired elevation.
4	Headrest Clamping Screw	Used to adjust the driver's headrest for best viewing.
5	Left and Right Focus Controls	Used to focus the eyepieces.

TA 070778

INFRARED (IR) PERISCOPE, M19
QUICK RELEASE
(PERISCOPE MOUNT)

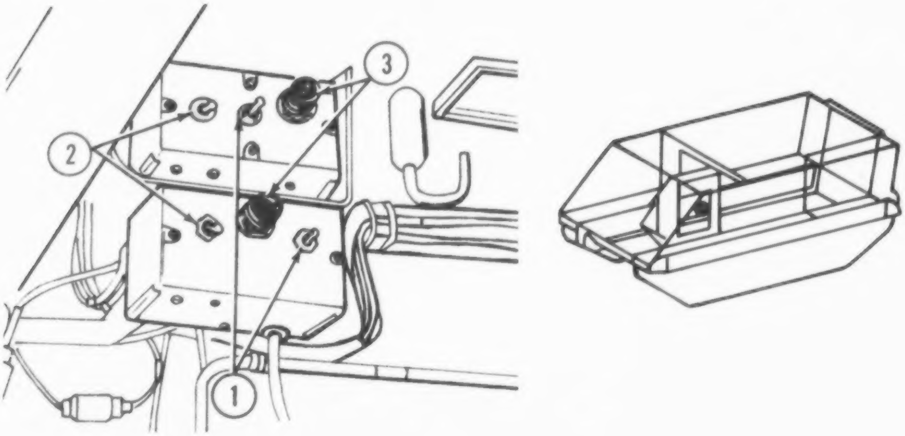




Key	Control or Indicator	Function
1	Thumbscrew	Prevents periscope and plug from accidently falling out.
2	Plug	Inserted in the receptacle for protection from the elements, and from shell fragments when periscope is not used.
3	Plug Latching Levers	Used to remove and reinsert plug.
4	Latches	Hold periscope in place when installed.
5	Azimuth Locking Knob	Prevents plate and periscope (if mounted) from turning after desired azimuth is set.

TA 070779

PERSONNEL AND COOLANT HEATER CONTROLS



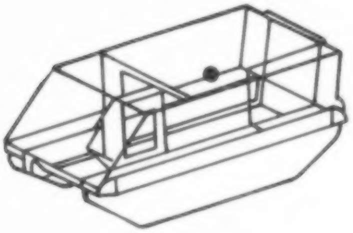
NOTE

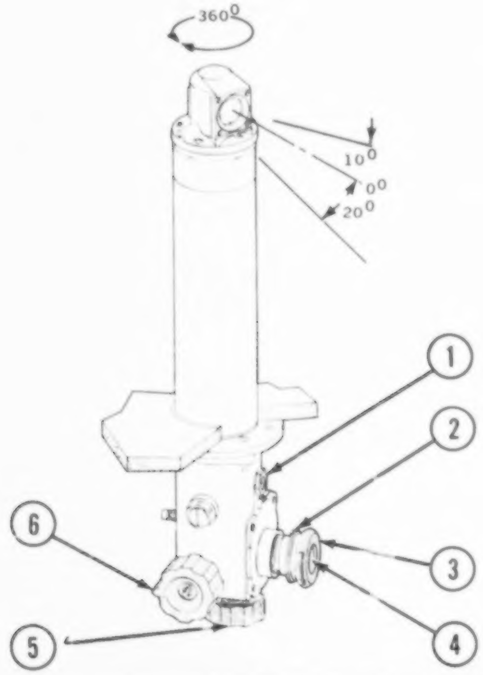
Coolant heater is installed only on vehicles operating in climates where temperatures regularly drop to –25°F and below. Control boxes for the two heaters look somewhat different but work identically.

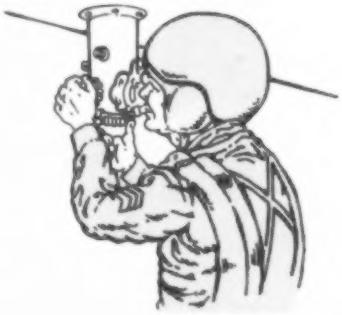
Key	Control or Indicator	Function
1	RUN/OFF/START Switch	Spring-loaded switch starts and operates the heater, and turns it off. Switch is held to START until heater ignites and then placed to RUN to keep it operating.
2	HI-LO Switch	Allows operator to control the temperature.
3	Indicator	Indicates when heater has ignited and is running.

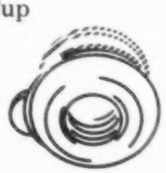
TA 070780

SQUAD LEADER'S PERISCOPE CONTROLS AND INDICATORS



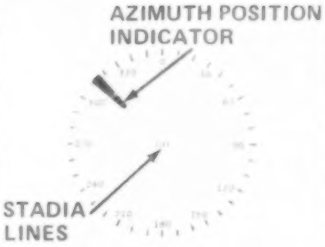
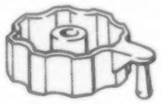
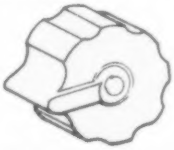




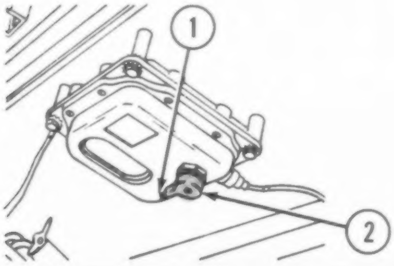
Key	Control or Indicator	Function
1	Humidity Indicator 	Turns a shade of pink when desiccant needs replacing.
2	Focus Control 	Focus control, located directly behind eye cup, can be turned to properly focus image.
3	Eye Cup 	Inflatable rubber eye cup protects eye of operator during use.

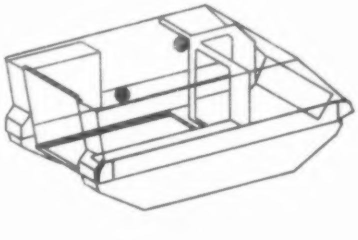
TA 070781

SQUAD LEADER'S PERISCOPE CONTROLS AND INDICATORS

Key	Control or Indicator	Function
4	Reticle 	Azimuth position relative to front of vehicle is indicated in degrees within viewing field. The azimuth position indicator rotates when azimuth control is turned. Stadia lines in the center are provided for range estimation.
5	Azimuth Control 	Rotates sight in azimuth. Turn handle right to rotate line-of-sight to right, left for left rotation.
6	Elevation Control 	Rotate arrow upwards to raise line-of-sight; down to lower line-of-sight. Full range is 10° above horizontal and 20° below horizontal.

DOMELIGHT CONTROLS

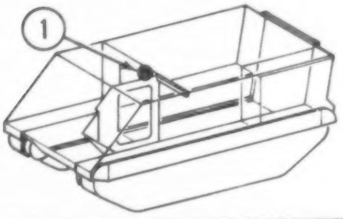


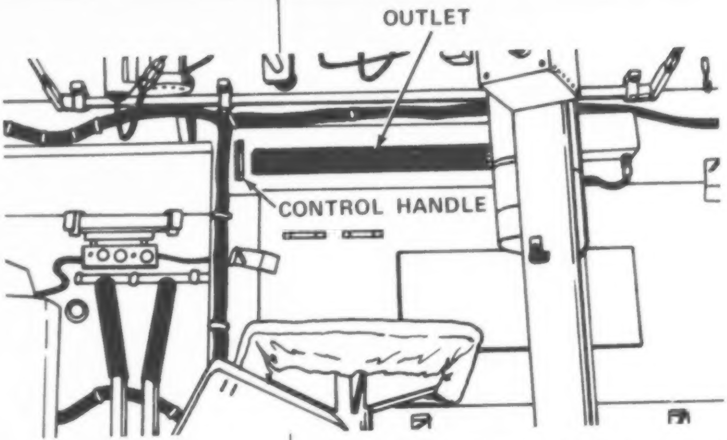


Key	Control or Indicator	Function
1	Detent	Locks domelight switch in selected position. Push in to unlock.
2	Switch	3-position switch, to turn light to bright, blackout, or off positions.

TA 070782

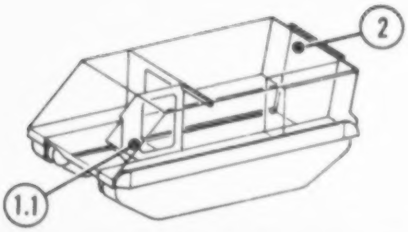
CREW COMPARTMENT VENT CONTROLS

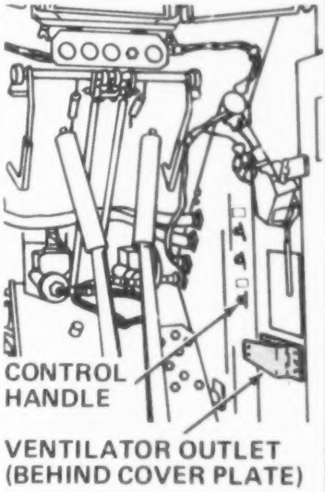


Key	Control or Indicator	Function
		
1	Front Ventilator (M901/M113A1 M901A1/M113A1)	The front ventilator is located above the engine compartment rear access panel and extracts air from the personnel compartment. Pushing control handle up closes the ventilator; pulling it down opens it.

TA 159141

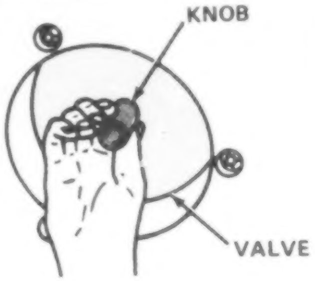
CREW COMPARTMENT VENT CONTROLS



Key	Control or Indicator	Function
		
1.1	Front Ventilator (M901/M113A2 M901A1/M113A2)	The front ventilator is located below the transmission range selector and extracts air from the personnel compartment. The screen outlet is pretected by a cover plate. The front ventilator control handle is located to the left of the ventilator below the hand throttle control. Pulling out the control handle closes the ventilator; pushing in the control handle opens it.

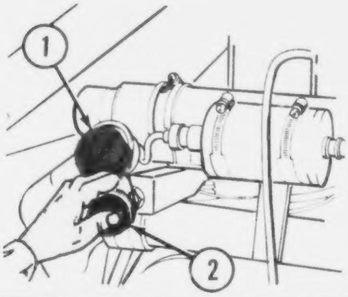
TA 159142

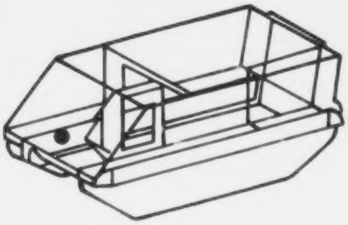
CREW COMPARTMENT VENT CONTROLS

Key	Control or Indicator	Function
2	Rear Personnel Compartment Ventilator  	This ventilator is located in the ceiling of the personnel compartment and is used with the front ventilator to let fresh air into the personnel compartment. Push knob up to ventilate; pull it down to close ventilator valve.

TA 157870

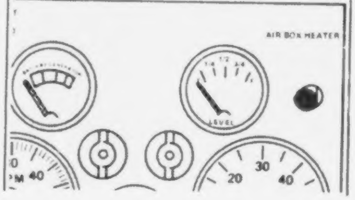
AIR BOX HEATER CONTROLS AND INDICATORS



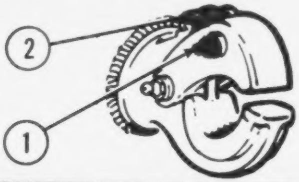


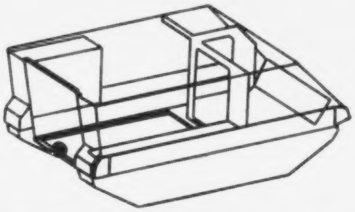
NOTE

Newer vehicles are equipped with electric fuel pumps that require no action by the operator other than to turn on the AIR BOX HEATER switch.

Key	Control or Indicator	Function
1	Pressure Indicator	Indicates the pressure in the accumulator. It should indicate to the right of the shaded area to start the engine.
2	Fuel Pump	Used to build up and maintain pressure in the accumulator.
3	AIR BOX HEATER Switch	Turns air box heater on for cold starting of engine.
		

TOWING PINTLE

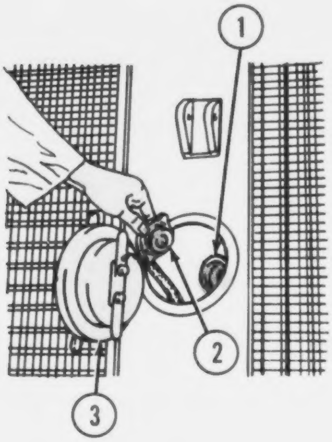


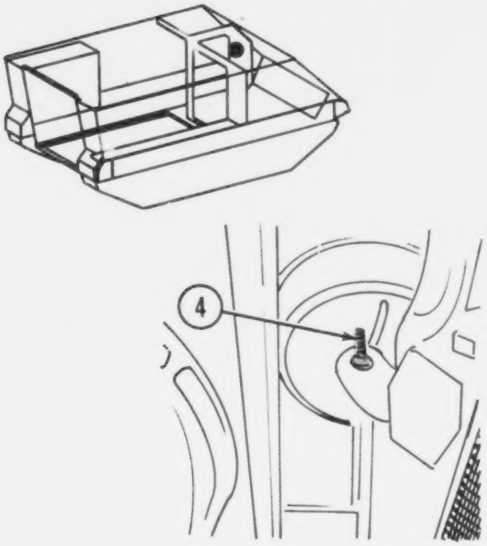


Key	Control or Indicator	Function
1	Cotter Pin	When inserted locks pintle for added safety when pulling a trailer or another vehicle.
2	Pintle Latch	Locks and unlocks pintle. Lift latch up to unlock pintle.

TA 070784

ENGINE COOLANT FILLER CONTROLS





Key	Control or Indicator	Function
1	Filler Neck	Used to check and add coolant.
2	Radiator Cap	Provides an airtight seal for radiator.
3	Radiator Cover	Protects radiator from overhead fire and shell fragments.
4	Combat Lock	Locks radiator cover from inside. Access to lock is gained thru rear engine compartment panel.

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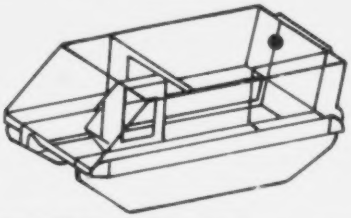
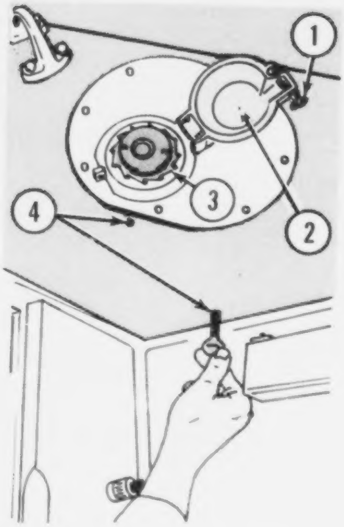
TA 070785

FUEL FILLER CONTROLS





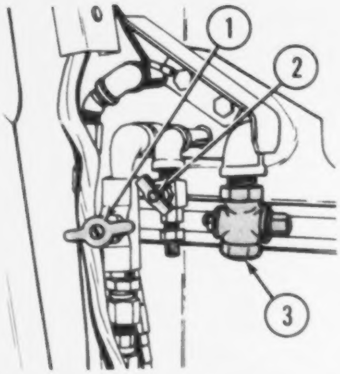
WARNING

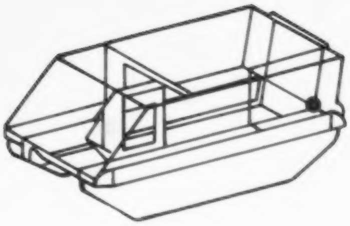
When handling fuel, provide metal-to-metal contact between container and vehicle to prevent static electricity. Observe all related safety rules. The fuel tank should be filled no more than 5 inches below the top rim of the fuel filler neck to allow for fuel expansion.

Key	Control or Indicator	Function
1	Fuel Cover Latch	Latches fuel cover plate (2) in closed position.
2	Fuel Filler Cover	Protects fuel tank from overhead fire and shell fragments.
3	Fuel Filler Cap	Provides an airtight seal to fuel tank.
4	Combat Lock	Locks fuel tank cover from inside of vehicle.

TA 070786

FUEL CUTOFF AND DRAIN VALVES

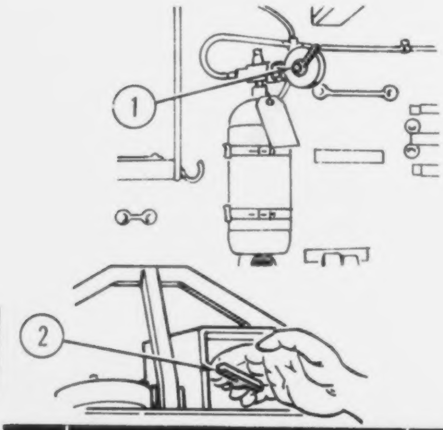


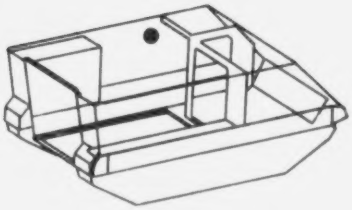


Key	Control or Indicator	Function
1	Engine Fuel Cutoff Valve	Controls fuel flow to engine compartment.
2	Heater Fuel Supply Valve	Controls fuel flow to personnel and/or coolant heaters if so equipped.
3	Fuel Drain Valve	Used to drain the 95-gallon fuel tank if necessary for maintenance.

TA 070787

FIXED FIRE EXTINGUISHER CONTROLS



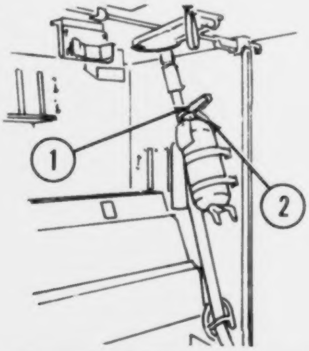


WARNING

Learn to use the fire extinguishers now. It's too late to learn after a fire has started.

Key	Control or Indicator	Function
1	Internal Fixed Fire Extinguisher Handle	Used to operate fire extinguisher in case of fire in the engine compartment.
2	External Fixed Fire Extinguisher Handle	Operates fixed fire extinguishers from outside of vehicle.

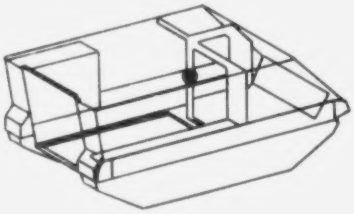
PORTABLE FIRE EXTINGUISHER CONTROLS

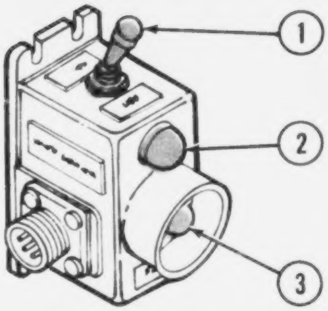


Key	Control or Indicator	Function
1	Safety Pin	Prevents accidental discharge of extinguisher. Pull out when needed.
2	Actuator	Turns fire extinguisher on when pushed down and safety pin is pulled out.

TA 157871

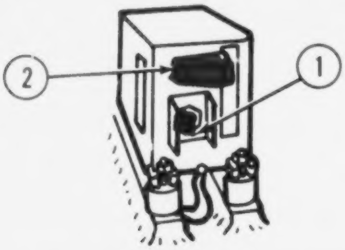
SMOKE GRENADE LAUNCHER CONTROLS AND INDICATORS

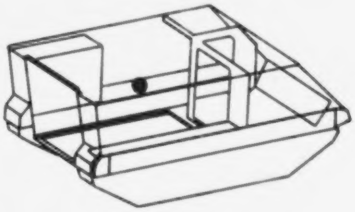




Key	Control or Indicator	Function
1	ARM/OFF Switch	Energizes smoke grenade circuits when in ARM position. Switch handle is spring-loaded and must be pulled up to change position.
2	Power On (ARM) Indicator	Lights when switch (1) is in ARM position.
3	FIRE Switch	Pushbutton switch is pressed to fire grenades.

ELECTRICAL TRANSIENT SUPPRESSOR

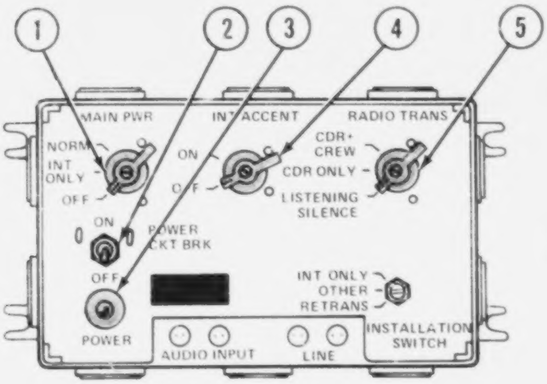




Key	Control or Indicator	Function
1	Circuit Breaker Switch	Protects communication system from transients induced by engine starter. Also protects system from accidental reversal of power leads.
2	BATTLE OVERRIDE Switch	Overrides circuit breaker to keep system on in emergency condition and when circuit breaker has tripped.

TA 070789

AMPLIFIER AM-1780/VRC CONTROLS AND INDICATORS



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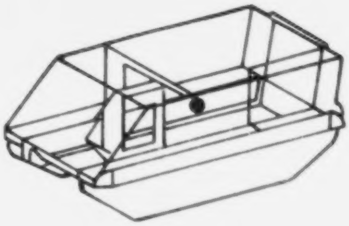
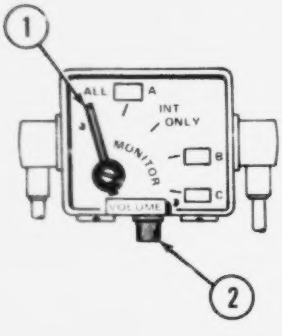
MAIN PWR
INT ACCENT
RADIO TRANS
NORM
INT ONLY
OFF
ON
OFF
CDR+ CREW
CDR ONLY
LISTENING SILENCE
ON
POWER CKT BRK
OFF
INT ONLY
OTHER
RETRANS
POWER
AUDIO INPUT
LINE
INSTALLATION SWITCH

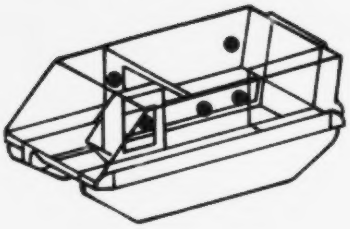


Key	Control or Indicator	Function
1	MAIN PWR Switch	Selector switch for following functions: NORM—Applies power to all circuits in intercom system. INT ONLY—Applies power only to INTERCOM. OFF—Removes power.
2	POWER CKT BKR Circuit Breaker	Protects circuits from current overload. Will trip to OFF if overloaded.
3	POWER Indicator	Lights when power is applied to intercom system.
4	INT ACCENT Switch	Selector switch for following functions: OFF—Intercom and radio sound levels are equal. ON—Radio sound level is lower than intercom.
5	RADIO TRANS Switch	Selector switch for following functions: CDR + CREW—All stations may transmit and listen over radio. CDR ONLY—Only the commander's station can transmit over radio, all crew may listen. LISTENING SILENCE—All stations can listen but none can transmit over radio.

TA 157872

INTERCOM CONTROL
C-2298/VRC

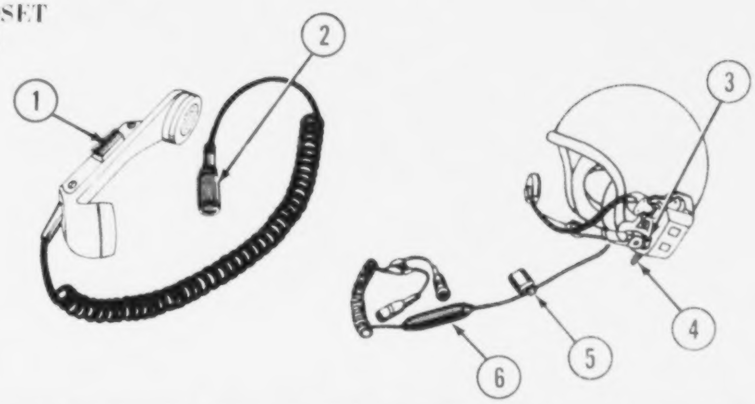

1
ALL
A
INT ONLY
MONITOR
B
C
VOLUME
2



Key	Control or Indicator	Function
1	MONITOR Switch	Selects the following functions. All, A or B—to transmit/receive on receiver-transmitter. INT ONLY—to talk to crew only. C—not used.
2	Volume Control	Adjusts volume to desired level.

TA 070791

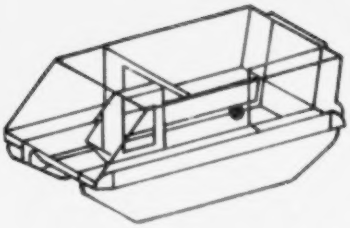
CVC HELMET AND HANDSET CONTROLS

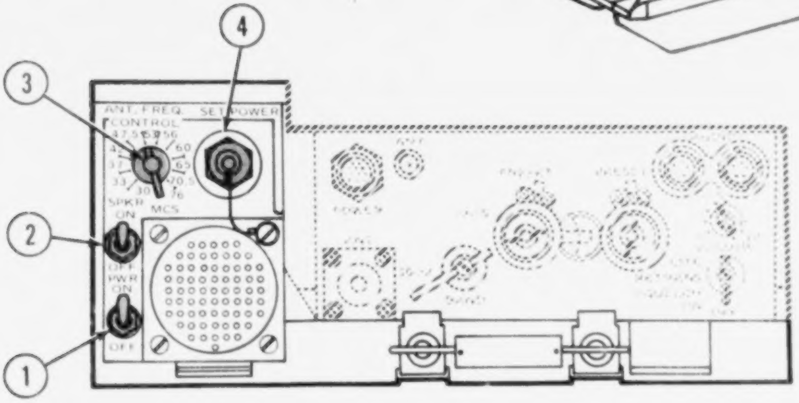


Key	Control or Indicator	Function
1	Switch	Pushbutton switch is used for talking on the radio. Button is released for listening.
2	Connector	Connects to receiver-transmitter.
3	Microphone Control Knob	Positions mike as desired by operator.
4	Radio/Intercom Switch Handle	Three position switch. Switch works as follows: Forward position is used for talking on radio. Center position is for monitoring the intercom and radio. Rear position is for talking and listening on intercom only.
5	Clothes Clip	Secures cables to clothing of wearer.
6	Quick Disconnect Connector	Pulls out for emergency evacuation of vehicle.

TA 157873

AMPLIFIER-POWER SUPPLY AM-2060/GRC CONTROLS AND INDICATORS

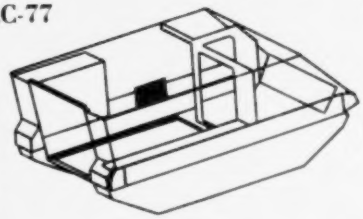



4
3
ANT. FREQ.
CONTROL
47.5
53
56
42
60
37
65
33
70.5
30
76
MCS
SET POWER
SPKR
ON
OFF
PWR
ON
OFF
2
1

Key	Control or Indicator	Function
1	PWR (Power) Switch 	Turns amplifier power supply (and radio) on and off.
2	SPKR (Speaker) Switch 	Turns speaker on and off.
3	ANT. FREQ. (Antenna Frequency) CONTROL 	Selects proper loading for vehicle antenna.
4	SET POWER Connector 	Provides for electrical connection between Amplifier-Power Supply and Receiver-Transmitter

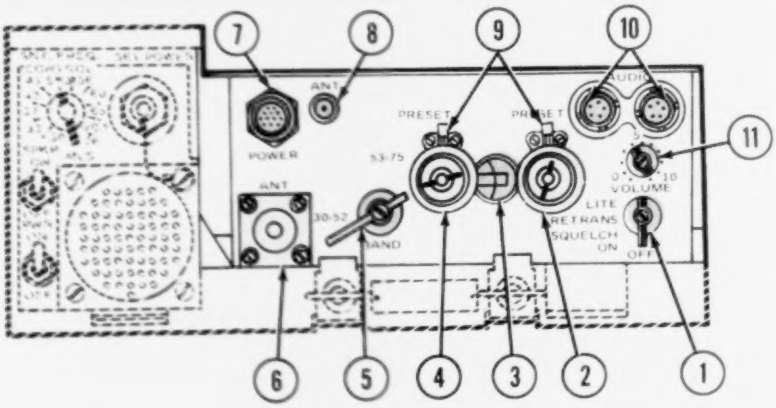
TA 070793

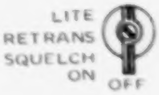
RADIO RECEIVER-TRANSMITTER RT-841/PRC-77 CONTROLS AND INDICATORS



NOTE

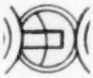
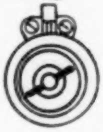
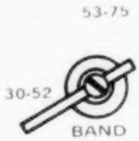
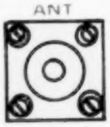
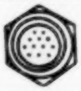
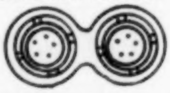
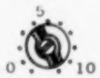
Location shown is normal operation location. Receiver-transmitter is dismounted and used with other components for communication away from vehicle.


7
8
9
10
11
POWER
ANT
PRESET
PRESET
AUDIO
53-75
30-52
BAND
ANT
5
0
10
VOLUME
LITE
RETRANS
SQUELCH
ON
OFF
6
5
4
3
2
1

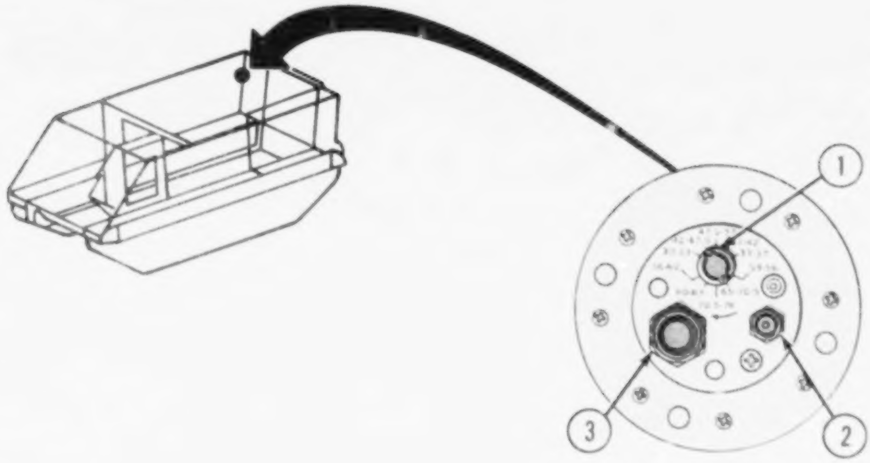
Key	Control or Indicator	Function
1	Function Switch  LITE RETRANS SQUELCH ON OFF	ON and OFF positions turn set on or off. Three other positions are provided as follows: SQUELCH position—When in this position radio set is on. Noise is automatically reduced when no signal is received. RETRANS position—Permits radio relay operation. LITE position (spring-loaded)—Illuminates REC-TRANS FREQUENCY dial when held in this position.
2	KHz Tuning Control 	Tunes in 50-kHz steps as indicated by REC-TRANS FREQUENCY dial.

TA 070794

RADIO RECEIVER-TRANSMITTER RT-841/PRC-77 CONTROLS AND INDICATORS

Key	Control or Indicator	Function
3	REC-TRANS FREQUENCY dial 	Indicates operating frequency.
4	MHz Tuning Control 	Tunes in 1-MHz steps as indicated by REC-TRANS FREQUENCY dial.
5	Band Switch 	30-52 position selects lower MHz-frequency band. 53-75 position selects higher MHz-frequency band.
6	Antenna Mount 	Supports antenna for off-vehicle operation.
7	Power Connector 	Receptacle for connecting power cable.
8	ANT (Antenna) Connector	Receptacle for vehicle antenna.
9	Frequency PRESET Controls	Permits rapid tuning of two preset frequencies.
10	AUDIO Connectors 	Connection for audio accessories such as handset.
11	VOLUME Control 	Varies receiver volume.

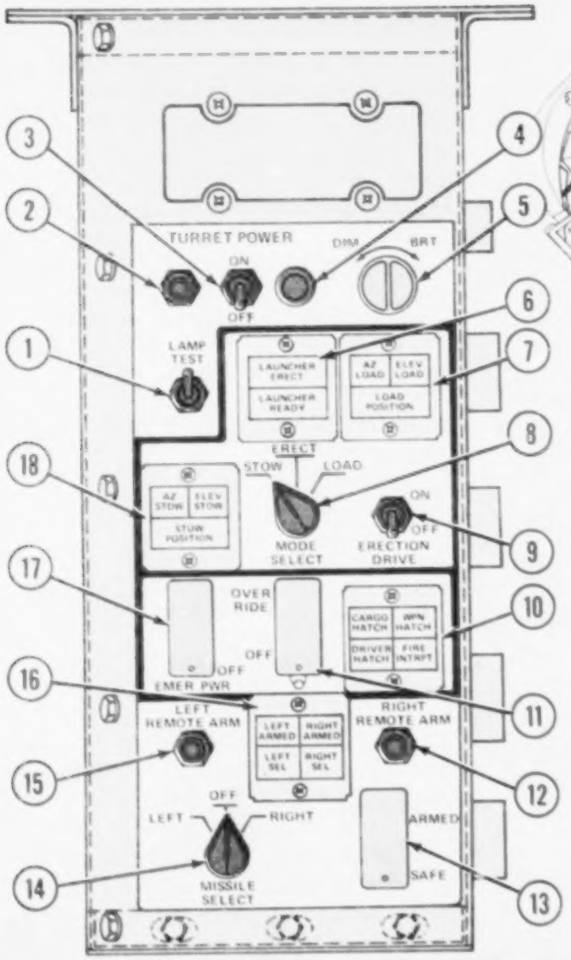
MATCHING UNIT–BASE ANTENNA MX-6707/VRC

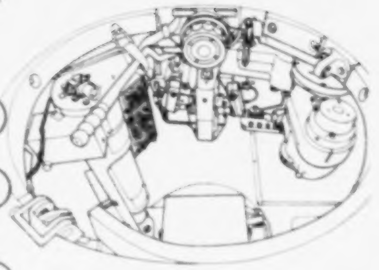


Key	Control or Indicator	Function
1	S1 Switch	A ten-position rotary switch that selects proper loading for antenna.
2	J1 Connector	Used to connect matching unit to ANT (Antenna) connector on radio receiver-transmitter.
3	J2 Connector	Used to connect matching unit to ANTENNA CONTROL connector on amplifier power supply.

TA 070796

GUNNER'S CONTROL PANEL CONTROLS AND INDICATORS


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
TURRET POWER
ON
OFF
DIM
BRT
LAMP TEST
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
ERECT
STOW
LOAD
AZ STOW
ELEV STOW
STOW POSITION
MODE SELECT
ON
OFF
ERECTION DRIVE
OVER RIDE
OFF
EMER PWR
OFF
CARGO HATCH
WPN HATCH
DRIVER HATCH
FIRE INTRPT
LEFT REMOTE ARM
LEFT ARMED
RIGHT ARMED
LEFT SEL
RIGHT SEL
RIGHT REMOTE ARM
OFF
LEFT
RIGHT
MISSILE SELECT
ARMED
SAFE



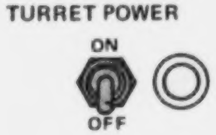
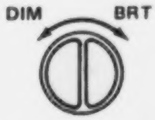
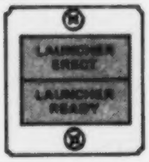
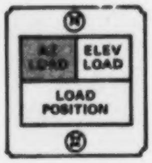
NOTE

Vehicle MASTER SWITCH must be ON for controls and indicators to operate as described.

Key	Control or Indicator	Function
1	 LAMP TEST Switch	When spring-loaded switch is held down, all lights except TURRET POWER are on.

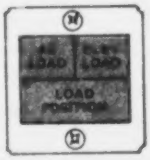
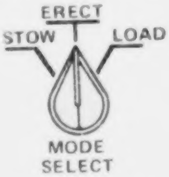
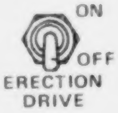
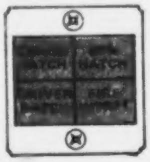
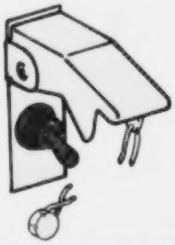
TA 070797

GUNNER'S CONTROL PANEL CONTROLS AND INDICATORS

Key	Control or Indicator	Function
2	5 Amp Circuit Breaker 	Circuit breaker protects turret control circuits. Pops out when load exceeds 5 Amperes.
3	TURRET POWER Switch  TURRET POWER ON OFF	When positioned to ON, applies 24 Vdc to turret.
4	TURRET POWER Indicator TURRET POWER ON OFF	Lights when TURRET POWER is switched to ON.
5	DIM—BRT Control  	Allows operator to adjust brightness of panel indicators.
6	LAUNCHER ERECT/ LAUNCHER READY Indicator  LAUNCHER ERECT LAUNCHER READY	LAUNCHER ERECT indicator lights when launcher is erected. LAUNCHER READY indicator lights when launcher is erected and erection safety locks are engaged.
7	AZ LOAD/ELEV LOAD/ LOAD POSITION Indicator  AZ LOAD ELEV LOAD LOAD POSITION	Provides indications of launcher loading positions. AZ LOAD INDICATOR—Lights when turret is at 0^{o} position in azimuth.

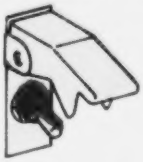
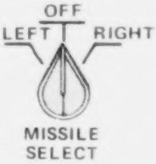
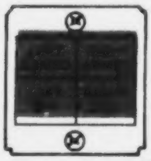
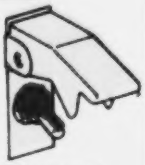
TA 070798

GUNNER'S CONTROL PANEL CONTROLS AND INDICATORS

Key	Control or Indicator	Function
		**ELEV LOAD** indicator—Lights when launcher is at maximum elevation. **LOAD POSITION** indicator—Lights when launcher is in load position. Both the **AZ LOAD** and **ELEV LOAD** lights must be on before launcher can be placed in the load position.
8	MODE SELECT Switch 	Selects position of launcher (STOW, ERECT, or LOAD) when ERECTION DRIVE switch is placed to ON.
9	ERECTION DRIVE Switch 	Turns on erection drive to place launcher to position selected on MODE SELECT switch (STOW, ERECT, LOAD).
10	Interrupt Indicator 	Indicates that the cargo hatch, gunner's hatch, or driver's hatch is not securely closed. The **FIRE INTRPT** indicator is on when the launcher is pointed at a portion of the vehicle or when the cargo hatch, gunner's hatch, or driver's hatch is open.
11	OVERRIDE Switch 	With switch in **OVERRIDE**, the launcher can traverse and elevate when hatches are open. It also allows gunner to fire a missile when fire interrupt conditions exist. With the switch in **OVERRIDE** position, the gunner can also arm one missile even if the other missile is not safe. Switch is safety wired in the **OFF** position.
12	RIGHT REMOTE ARM (2.5 Amp) Circuit Breaker	Pops out and removes power from right remote arming device when an overload condition exists.

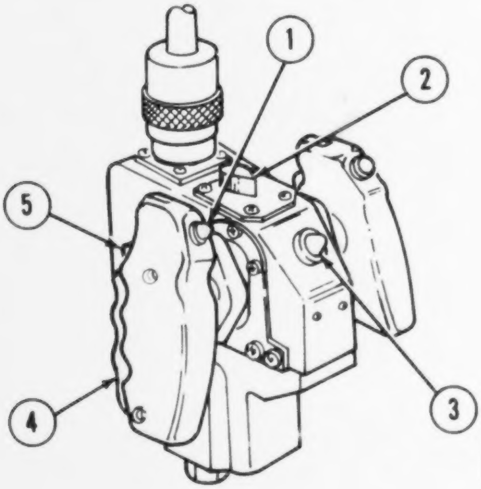
TA 112616

GUNNER'S CONTROL PANEL CONTROLS AND INDICATORS

Key	Control or Indicator	Function
13	SAFE/ARMED Switch 	At ARMED position, arms selected missile. Switch is positioned to SAFE position.
14	MISSILE SELECT Switch 	Selects missile to be fired: LEFT position selects left missile. RIGHT position selects right missile. No missile is selected in OFF position.
15	LEFT REMOTE ARM (2.5 Amp) Circuit Breaker	Pops out and removes power from left remote arming device when an overload exists.
16	LEFT SEL/RIGHT SEL and LEFT ARMED/RIGHT ARMED Indicators 	Indicate which missile is selected and if it is armed.
17	EMER PWR (emergency power) Switch 	Turns on emergency control power for use in manual backup operation. Normally positioned to OFF.
18	AZ STOW/ELEV STOW/STOW POSITION Indicator	Provides indication of launcher position. AZ STOW indicator—Lights when turret is at 180° position in azimuth. Launcher must be in this position for stowing. ELEV STOW indicator—Lights when launcher is between -5° and -10° in elevation. STOW POSITION indicator—Lights when launcher is stowed. Both the AZ STOW and ELEV STOW indicators must be on before the launcher can be placed in the stowed position.

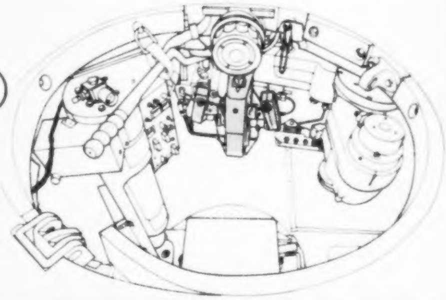
TA 112617

HAND CONTROL ASSEMBLY CONTROLS AND INDICATORS



WARNING

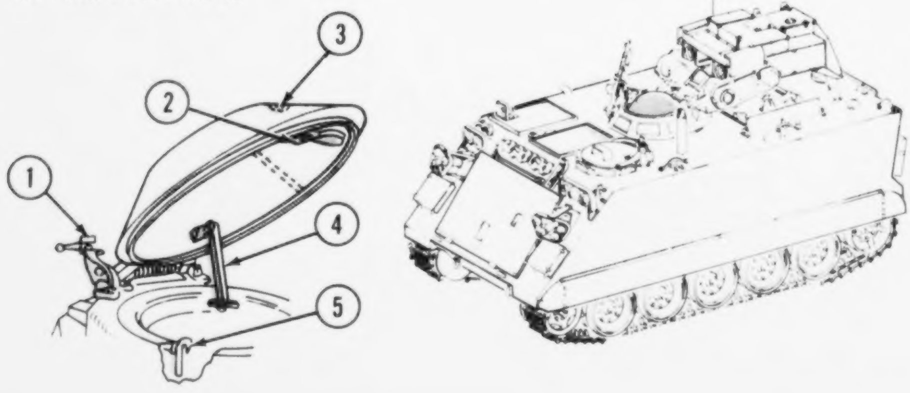
Trigger light will come on when a trigger switch has failed in the closed position. Do not load a missile if this light is on.



Key	Control or Indicator	Function
1	Missile Firing Trigger	When depressed, fires missile that is selected and armed. Press either the left or right fire button as desired, regardless of which missile is selected and armed.
2	Sight Select Switch	Selects 3X telescope, daysight/tracker, or nightsight.
3	TRIGGER Light	Lights when missile firing trigger(s) are depressed.
4	Handgrip Actuator Switch	When squeezed, allows handgrip controller to turn on. Each handgrip action switch can turn on the hydraulic system by itself, permitting launcher to be elevated/depressed and turned in azimuth at slow rate.
5	Slew Switch	With the handgrip action switch depressed, depressing the slew switch increases the traversing rate 4 times. Each slew switch can control operation independent of the other slew switch.

TA 157874

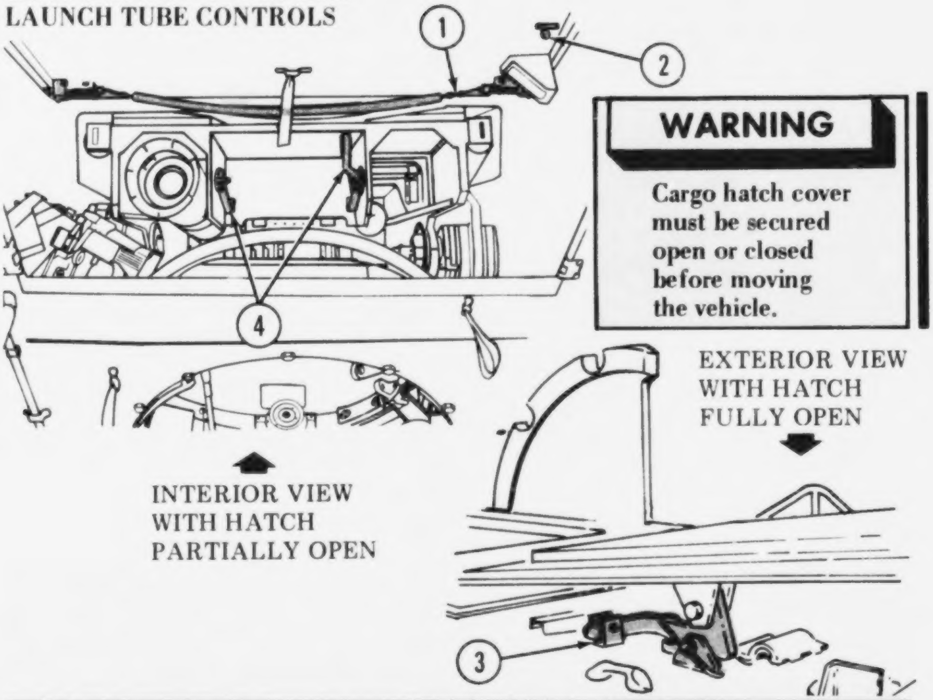
GUNNER'S HATCH COVER CONTROLS



Key	Control or Indicator	Function
1	Hatch Cover Positioner	Secures hatch in fully open position. Handle must be pulled forward to unlock.
2	Closing Strap	Strap is pulled to close hatch.
3	Retainer Catch	Engages with retainer mechanism (5) to close cover.
4	Positioner	Holds hatch in partially open position.
5	Retainer Mechanism	Locks hatch in closed position.

TA 070802

CARGO HATCH COVER AND LAUNCH TUBE CONTROLS



INTERIOR VIEW
WITH HATCH
PARTIALLY OPEN

EXTERIOR VIEW
WITH HATCH
FULLY OPEN

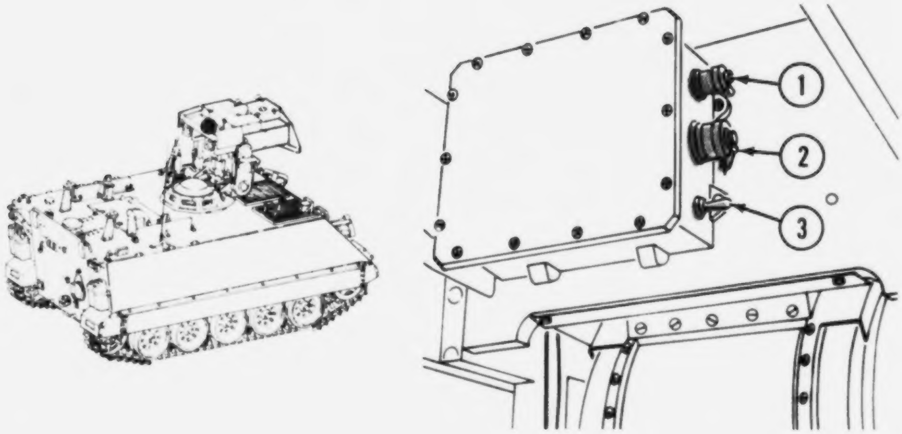
WARNING

Cargo hatch cover must be secured open or closed before moving the vehicle.

Key	Control or Indicator	Function
1	Interior Latch	Interior latch consists of a chain with a spring-loaded striker at each end. To open hatch, pull on chain to release strikers. Use strap (not chain) to lower hatch.
2	Detent Catch Knob	Allows cover to be latched in 3 open positions. When opening hatch, detent catch automatically slides into first detent. To release, pull out catch knob, slide toward center of vehicle and raise or lower hatch.
3	Exterior Latch	Catches and automatically locks cover open. Pin is used to secure cover in locked position. To release, remove pin and pull up on release handle.
4	Missile Locking Lever	Locks encased missile in launch tube for firing. Lever is pushed up to release empty case or unfired missile.

TA 157875

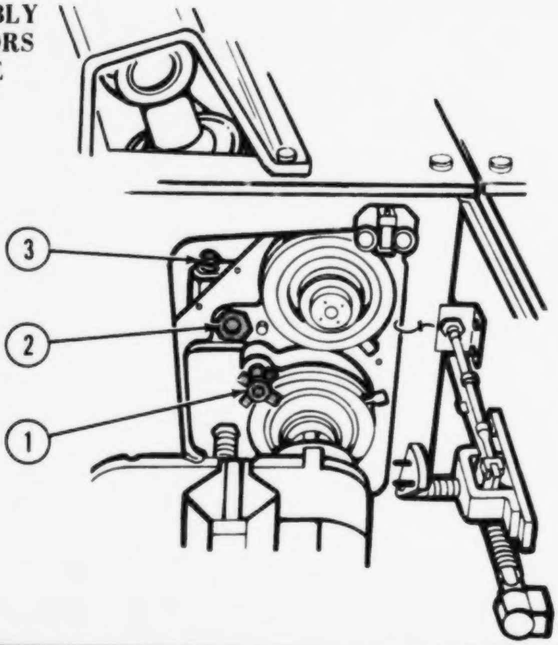
VEHICLE POWER CONDITIONER



Key	Control or Indicator	Function
1	Connector J1	Connects power conditioner to nightsight.
2	Connector J2	Connects power conditioner to vehicle.
3	Circuit Breaker	Provides an overload protection and on-off capability.

TA 070804

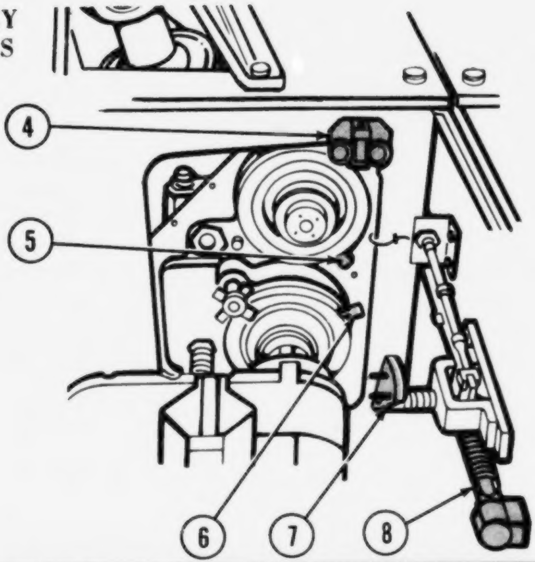
IMAGE TRANSFER ASSEMBLY CONTROLS AND INDICATORS AND NIGHTSIGHT REMOTE CONTROLS ACTUATORS



Key	Control or Indicator	Function
1	Manual Sight Select Switch	Allows the crew to manually select either the 3X, 13X, or nightsight position when detent plunger is pushed down. Arrow on handle points to the selected optics.
2	Upper ITA Humidity Indicator	Indicates by turning pink when humidity in upper image transfer assembly is above 50 percent.
3	Detent Plunger	Locks manual sight select switch in selected positions. Plunger is pushed down to release detent for positioning of manual sight select switch.

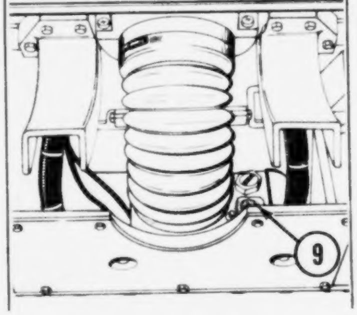
TA 070805

IMAGE TRANSFER ASSEMBLY CONTROLS AND INDICATORS AND NIGHTSIGHT REMOTE CONTROLS ACTUATORS

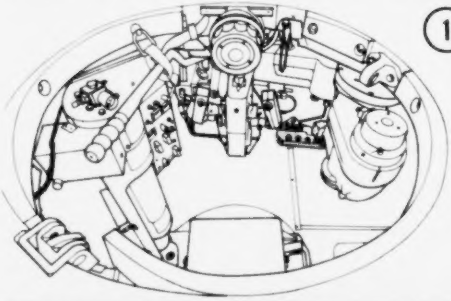


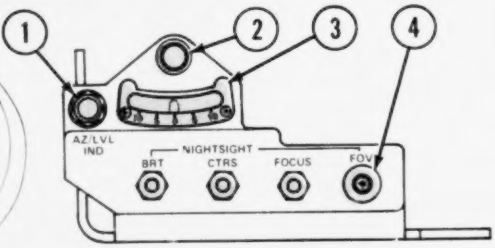
Key	Control or Indicator	Function
4	Nightsight CTRS (Contrast) and BRT (Brightness) Control Actuator Assembly	Provides gunner with capability to control brightness and contrast of nightsight from gunner's station. When nightsight is installed, assembly is moved from stowage location shown and attached to holding block on nightsight.
5	Nightsight Channel Lateral Alinement Tabs	Alines the line-of-sight of the ITA nightsight channel with the nightsight (left, right, up, or down).
6	Daysight Channel Lateral Alinement Tabs	Alines the line-of-sight of the ITA daysight/tracker channel with the daysight/tracker.
7	Nightsight FOV Actuator	Provides for remote selection (from gunner's station) of the wide or narrow field-of-view in the nightsight.
8	Nightsight Range Focus Actuator	Allows for remote control (from the gunner's station) of the RANGE FOCUS knob on the nightsight.

TA 070806

Key	Control or Indicator	Function
9	Lower ITA Humidity Indicator 	Indicates by turning pink when humidity in lower ITA is above 50 percent.

GUNNER'S LEVEL AND NIGHTSIGHT REMOTE CONTROLS AND INDICATORS

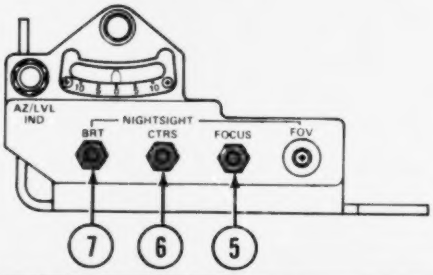




Key	Control or Indicator	Function
1	AZ/LVL IND (Azimuth/ Level Indicator) Light Switch	Push/pull switch used to turn level light and azimuth indicator light on and off.
2	Gunner's Level Light	Illuminates gunner's level.
3	Gunner's Level	Indicates tilt of turret up to 10°. Probability of a hit is less if fired at angle greater than 10°.
4	FOV (Field-of-View) Control	Allows gunner to control the field-of-view thru the nightsight from the gunner's station. Narrow field-of-view (handle pulled out) is used for tracking. Wide field-of-view (handle pushed in) is used for target acquisition.

TA 070807

GUNNER'S LEVEL AND NIGHTSIGHT REMOTE CONTROLS AND INDICATORS

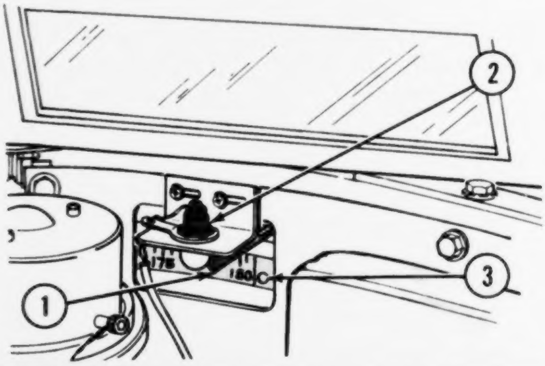


Key	Control or Indicator	Function
5	FOCUS Control	Spring-loaded toggle switch, used to control range focus of the nightsight from gunner's station.
6	CTRS (Contrast) Control	Spring-loaded toggle switch, used to control contrast of nightsight from gunner's station.
7	BRT (Brightness) Control	Spring-loaded toggle switch used to control brightness of display of nightsight from gunner's station.

AZIMUTH POSITION INDICATOR

NOTE

Located to right of gunner.



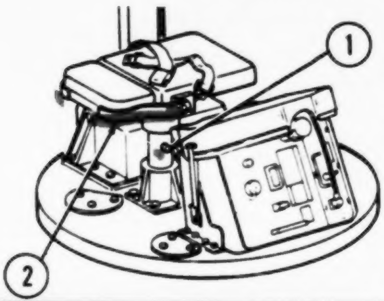
Key	Control or Indicator	Function
1	Pointer	Indicates the azimuth position of turret in relation to vehicle.
2	Indicator Light	Illuminates the pointer and scale.
3	Degree Scale	Scale is graduated in degrees.

TA 070808

GUNNER'S SEAT CONTROLS

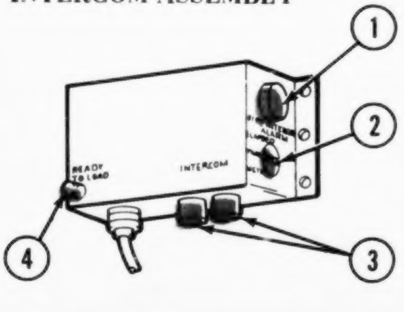
WARNING

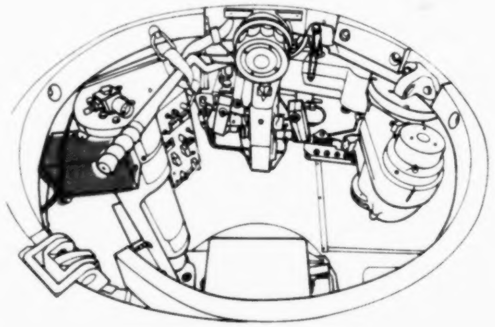
During turret operation the squad leader must be alert to the swing of the missile guidance set to prevent injury.



Key	Control or Indicator	Function
1	Height Adjustment Pin	Provides for adjustment in seat height.
2	Hinge	Allows gunner to raise seat section to allow him to stand on turret platform for operation of machinegun.

FIRE INTERRUPT/ INTERCOM ASSEMBLY

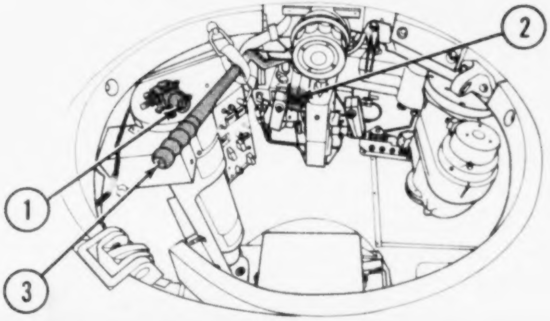


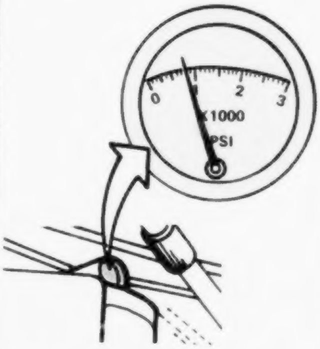
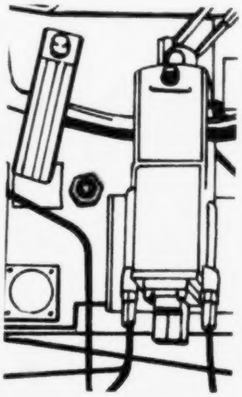


Key	Control or Indicator	Function
1	FIRE INTERRUPT ALARM	Sounds an audible alarm when launcher is positioned in a no-fire zone with a missile selected.
2	ELAPSED TIME Meter	Displays total operating time of turret in hours.
3	INTERCOM Jacks	Input/output connectors for intercom.
4	READY TO LOAD Light	Indicates to loader when launcher is in load position.

TA 158944

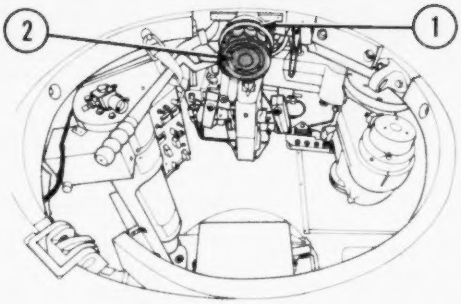
TURRET HYDRAULIC'S INDICATORS

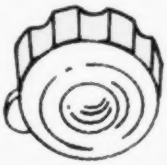


Key	Control or Indicator	Function
1	Accumulator Pressure Gage  	Indicates accumulator pressure in hydraulic system.
2	Sight Window 	The sight gage window shows if there is air in the hydraulic system. Air will show up as bubbles or a milky color in the fluid.
3	Manual Hydraulic System Pump Handle	Used to build up hydraulic pressure in hydraulic system manually if electrical pump is inoperative.

TA 070810

IMAGE TRANSFER ASSEMBLY EYEPIECE



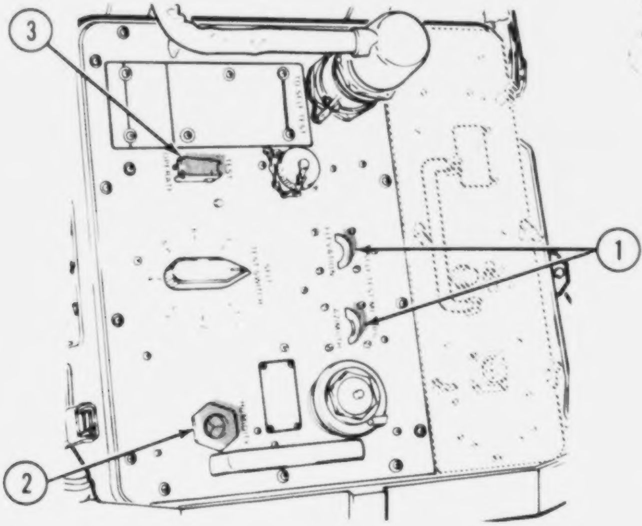
Key	Control or Indicator	Function
1	Diopter (Focusing) Ring 	Used for focusing all channels in the ITA. NOTE **If all channels have been alined, the gunner should not have to adjust the diopter ring when switching from one channel to another.**
2	Inflatable Eye Cup 	Protects gunner's eye and provides a means of support while tracking. To remove, push in and turn 1/8 of a turn counterclockwise. To install, line up slots, push in and turn right until it is firmly seated. NOTE **When glass surfaces are cold it may be necessary to remove the eye cup while tracking to prevent fogging of the eyepiece.**

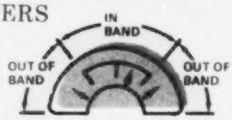
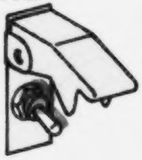
TA 070811

MISSILE GUIDANCE SET (MGS) CONTROLS AND INDICATORS (M901)

NOTE

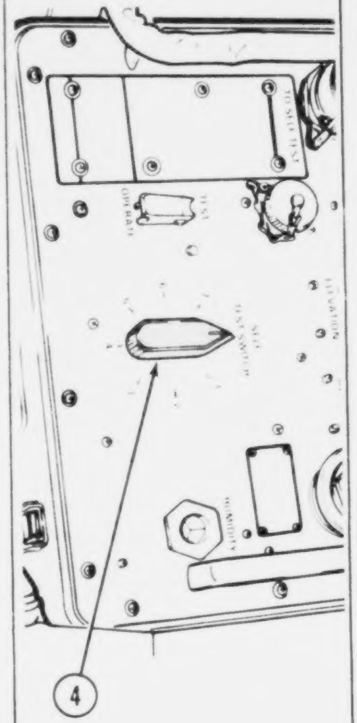
MGS is shown in operational location for turret use. It is dismounted for use in ground mode and the MGS spare battery is used instead of the TVPC.



Key	Control or Indicator	Function
1	ELEVATION and AZIMUTH SELF TEST METERS 	Indicate results of launcher self test at each step in the self test program.
2	HUMIDITY Indicator	Indicates moisture content inside missile guidance set.
3	TEST/OPERATE Switch 	Permits launcher self testing when held in TEST position. Permits firing of missiles in OPERATE position.

TA 159143

MISSILE GUIDANCE SET CONTROLS AND INDICATORS (M901)

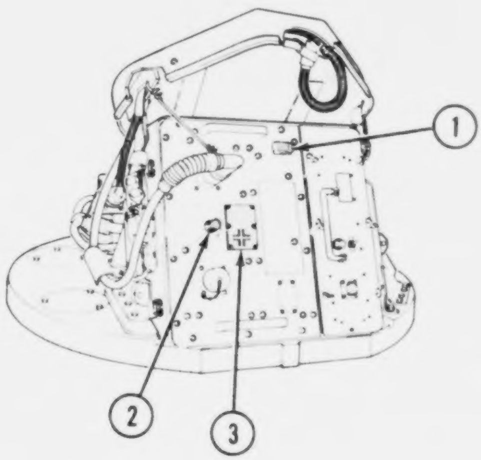
Key	Control or Indicator	Function
4	SELF TEST SWITCH  TO SELF TEST TEST OPERATE SELF TEST SWITCH ELEVATION HUMIDITY 4	Used with TEST/OPERATE switch to perform self test of launcher as follows: Position 1 — Checks TVPC or MGS battery. Position 2 — Checks operation of circuit in missile guidance set and traversing unit or turret. Positions 3 through 6 — Checks circuits in the MGS. Position 7 — Allows boresight alinement of daysight/tracker.

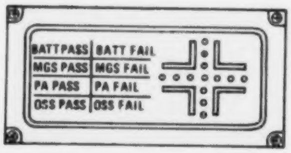
TA 159144

MISSILE GUIDANCE SET (MGS) CONTROLS AND INDICATORS (M901A1)

NOTE

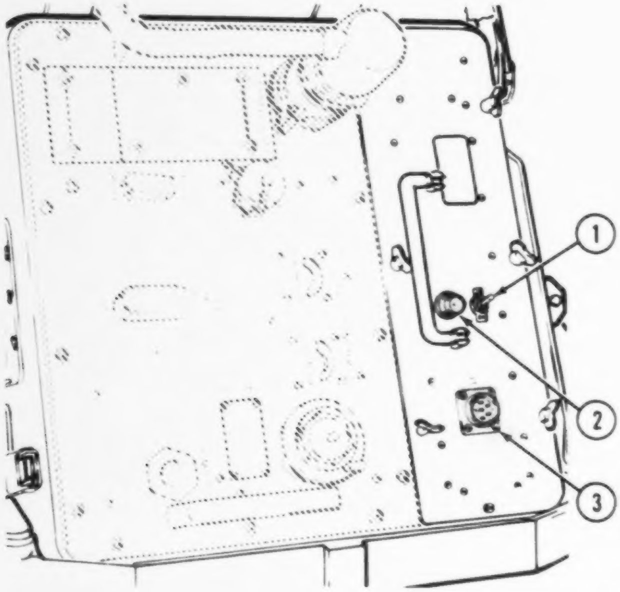
MGS is shown in operational location for turret use. It is dismounted for use in ground mode and the MGS spare battery is used instead of the TVPC.



Key	Control or Indicator	Function
1	TEST/OPERATE Switch	Permits launcher self testing when held in TEST position. Permits firing of missiles in OPERATE position.
2	DISPLAY INTENSITY Control Knob	Controls brightness of self test pass/fail indicators.
3	Self Test Display Panel  BATT PASS BATT FAIL MGS PASS MGS FAIL PA PASS PA FAIL OSS PASS OSS FAIL	Contains the self test pass/fail and boresight indicators. Individual PASS/FAIL indicators light during self test depending on whether or not test for item is success or failure. Lamps on boresight cross light depending on status of boresight of daysight/tracker.

TA 159145

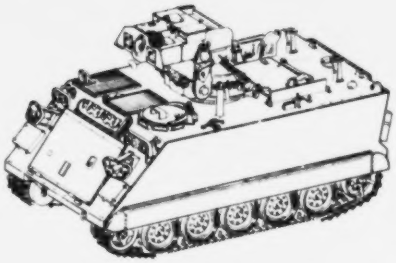
TOW VEHICLE POWER CONDITIONER CONTROLS AND INDICATORS



Key	Control or Indicator	Function
1	Power Switch	When in ON position, applies power to MGS.
2	Power Lamp	Lights when power switch is set to ON.
3	Connector J1	Connects TVPC to vehicle power.

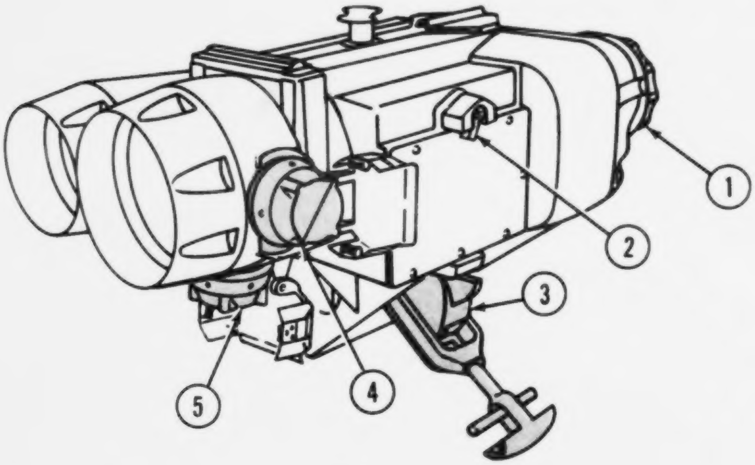
TA 157878

DAYSIGHT/TRACKER CONTROLS AND INDICATORS



NOTE

Daysight/tracker is shown in operational location for turret use. It is dismounted for use in ground emplacement configuration.



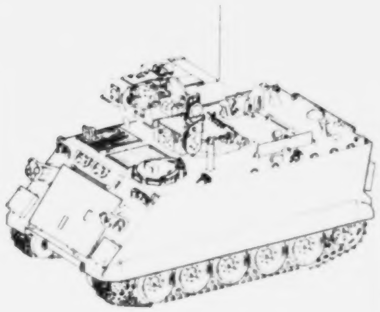
Key	Control or Indicator	Function
1	Diopter (Focusing) Ring	Permits focusing of reticle and/or target image.
2	RETICLE LIGHT Switch	Provides on/off control of reticle light when system is armed.
3	Latch Assembly	Locks daysight/tracker to launcher or traversing unit in ground-emplaced mode.
4	AZIMUTH Boresight Knob	Alines optics in the daysight/tracker in the horizontal plane. Alinement of both the vertical and horizontal plane is made in position 7 of the missile guidance set self test.
5	ELEVATION Boresight Knob	Alines optics in the daysight/tracker in the vertical plane.

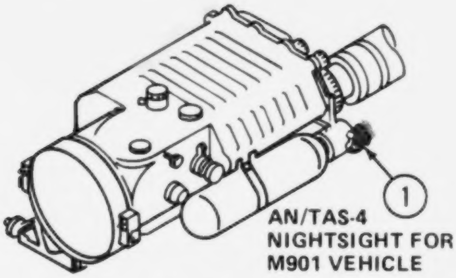
TA 070814

NIGHTSIGHT CONTROLS AND INDICATORS

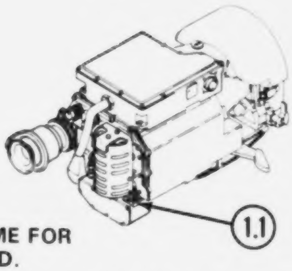
NOTE

Nightsight is shown in operational location for turret use. Nightsight is also needed to fire in the ground-emplaced configuration during the hours of darkness.



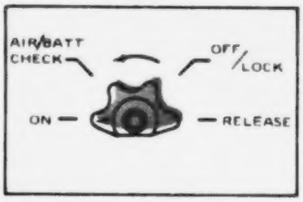


AN/TAS-4 NIGHTSIGHT FOR M901 VEHICLE



NOTE: CONTROLS AND INDICATORS ARE THE SAME FOR BOTH NIGHTSIGHTS, EXCEPT AS INDICATED.

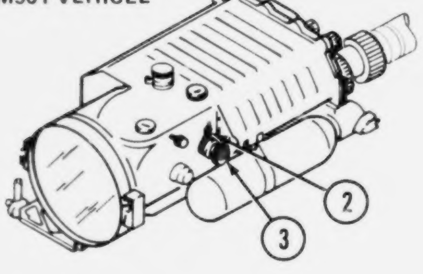
AN/TAS-4A NIGHTSIGHT FOR M901A1 VEHICLE

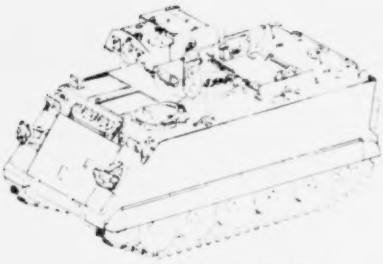
Key	Control or Indicator	Function
1	Actuator Switch (M901)  	Four-position switch that opens and closes coolant valves, turns electrical power on and off, and secures coolant cartridge in place. Functions of switch are as follows: RELEASE position—Electrical power off, and coolant cartridge released. OFF/LOCK position—Coolant off, electrical power off, coolant cartridge secured. AIR/BATT CHECK position—Coolant applied to gage only, electrical power on, coolant cartridge secured. ON position—Coolant to gage and system, electrical power on, coolant cartridge secured.
1.1	ON/OFF/STBY Switch (M901A1)	Turns nightsight and cooler power on. Selects standby operation and turns off power. ON—Power supplied to nightsight and cooler.

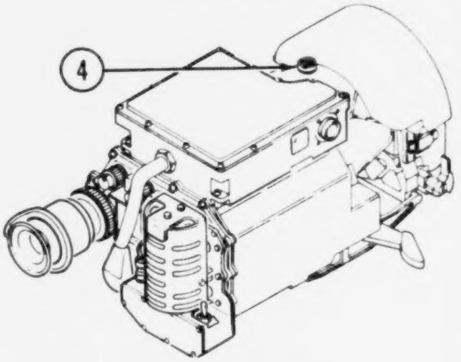
TA 159146

NIGHTSIGHT CONTROLS AND INDICATORS

AN/TAS-4
NIGHTSIGHT FOR
M901 VEHICLE







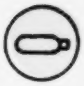
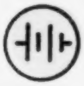
AN/TAS-4A NIGHTSIGHT
FOR M901A1 VEHICLE

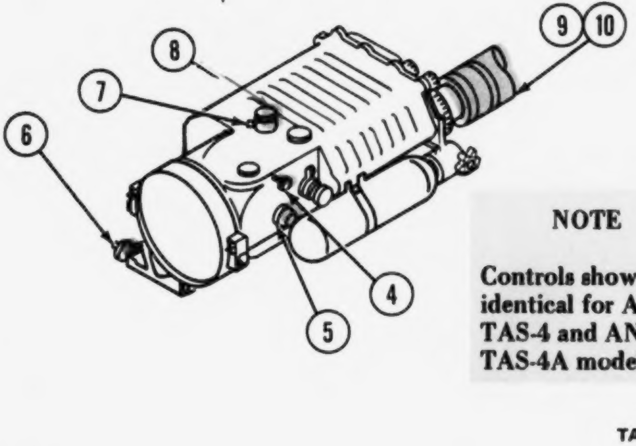
NOTE: CONTROLS AND INDICATORS ARE THE SAME FOR BOTH NIGHTSIGHTS, EXCEPT AS INDICATED.

Key	Control or Indicator	Function
		STBY—Power supplied to cooler only. The standby mode is used to conserve the batteries in the nightsight battery power conditioner. When in the STBY position the closed cycle cooler is operating, but the nightsight is not on. OFF—Power removed from nightsight and cooler.
2	Lock (azimuth boresight)	Locks AZ knob in position selected.
3	AZ (azimuth boresight)	Alines nightsight to daysight/tracker in azimuth.
4	Purge Valve (M901A1)	Provides access for purging nightsight.

TA 159147

NIGHTSIGHT CONTROLS AND INDICATORS

Key	Control or Indicator	Function
4	Field-of-view Selector	Selects wide field-of-view or narrow field-of-view.
5	RANGE FOCUS Knob	Focuses target.
6	Coarse Azimuth Adjustment	Provides for additional adjustment when normal azimuth adjustment is not enough.
7	Lock (elevation boresight)	Locks EL knob in position.
8	EL (elevation boresight) Knob	Alines nightsight to daysight/ tracker in elevation.
9	Coolant Cartridge Monitor (M901) 	Lights when coolant cartridge is down to less than 10 minutes of operation.
10	Battery Monitor 	Lights when battery charge is down to less than 10 minutes of operation.

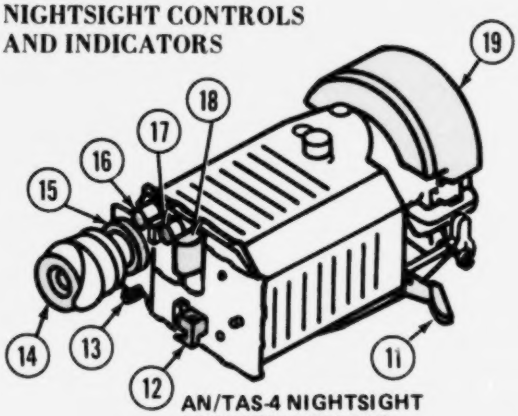


NOTE

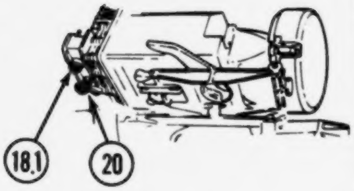
Controls shown are identical for AN/ TAS-4 and AN/ TAS-4A models.

TA 159148

NIGHTSIGHT CONTROLS AND INDICATORS



AN/TAS-4 NIGHTSIGHT
FOR M901 VEHICLE

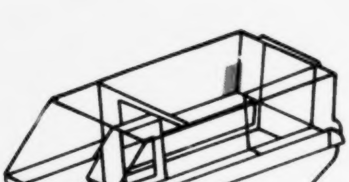


AN/TAS-4A NIGHTSIGHT
FOR M901A1 VEHICLE

Key	Control or Indicator	Function
11	Latching Handle	Secures nightsight to daysight/ tracker.
12	Battery Latch (M901)	Secures battery to nightsight.
13	Pressure Gage (M901)	Indicates coolant cartridge pressure.
14	Security Shutter	Opens when gunner presses eye against it when used. Normally closed to prevent enemy from spotting the firing position (only used in ground mode.)
15	Diopter (Focusing) Ring	Focuses sight reticle.
16	BRT Control	Controls brightness of display.
17	CTRS Control	Controls contrast of display
18	Power Connector (M901)	Provides hookup for electrical power (battery or cable from vehicle power conditioner).
18.1	Power Connector (M901A1)	Provides hookup for electrical power from nightsight battery power conditioner or vehicle power conditioner.
19	Front Lens Protector	Protects front lens from damage, dirt, and dust. Should be removed only to boresight the nightsight and to track and fire using the nightsight
20	Connector J4 (M901A1)	Provides hookup for boresight collimator cable.

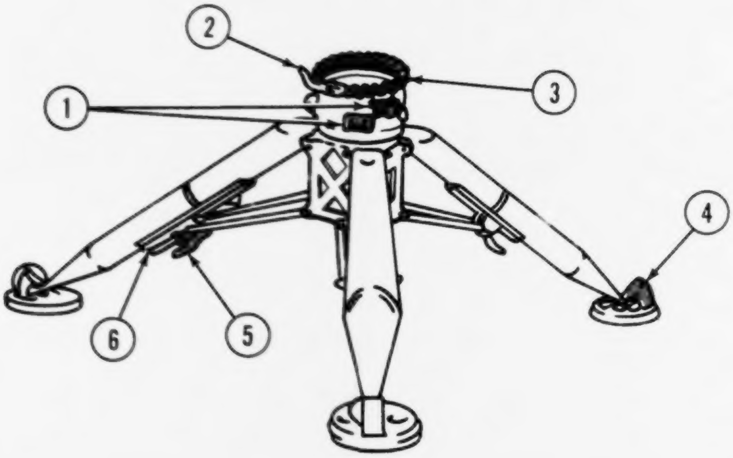
TA 159149

TOW TRIPOD CONTROLS AND INDICATORS



NOTE

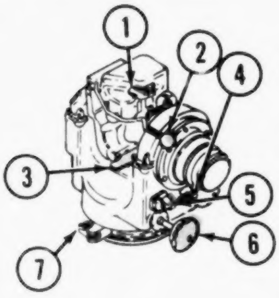
Location shown is for storage. Tripod is used only in TOW ground emplacement configuration.



Key	Control or Indicator	Function
1	Level Indicators	Indicate when tripod is level in horizontal plane.
2	Locking Handle	Locks coupling clamp.
3	Coupling Clamp	Provides means of securing traversing unit to tripod.
4	Anchor Claws	Adapt tripod to various types of terrain and provide stability.
5	Detent Stop Lever	Release mechanism from detent stops.
6	Lock Handle	Locks legs in desired position.

TA 070818

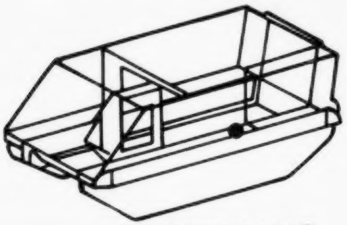
TOW TRAVERSING UNIT CONTROLS

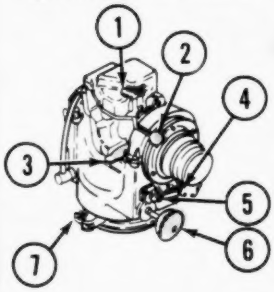

TRAVERSING UNIT ON M901 VEHICLE

NOTE

Location shown is for storage. Tripod is used only to fire a TOW missile in the ground-emplaced configuration.

Differences between the two units are primarily internal. Controls and indicators are identical.

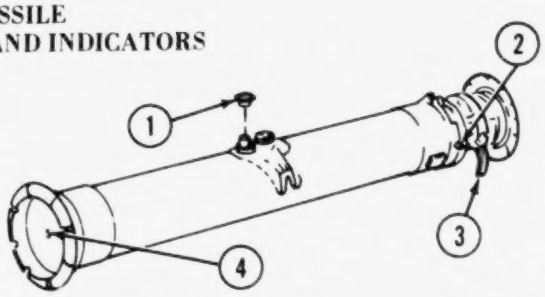



TRAVERSING UNIT ON M901A1 VEHICLE

Key	Control or Indicator	Function
1	Arming Lever	Operates the electrical connector—applies and removes the connector from the encased missile.
2	Locking Handle	Locks bridge clamp after encased missile is loaded in traversing unit and places missile holdback pin in "firing" position; when locking handle is raised after missile has been fired, the wire cutter switch closes to cut command-link wires.
3	Launch Tube Latch	Provides a means of securing the launch tube to the traversing unit.
4	Elevation Lock	Prevents trunnion from moving relative to body of the traversing unit.
5	Trigger	Energizes the TOW weapon system and initiates the firing sequence.
6	Control Knobs (2)	Serve as handles for rotating the traversing unit and elevating and depressing the trunnion.
7	Azimuth Lock	Prevents traversing unit from turning relative to tripod.

TA 159150

ENCASED MISSILE
CONTROLS AND INDICATORS



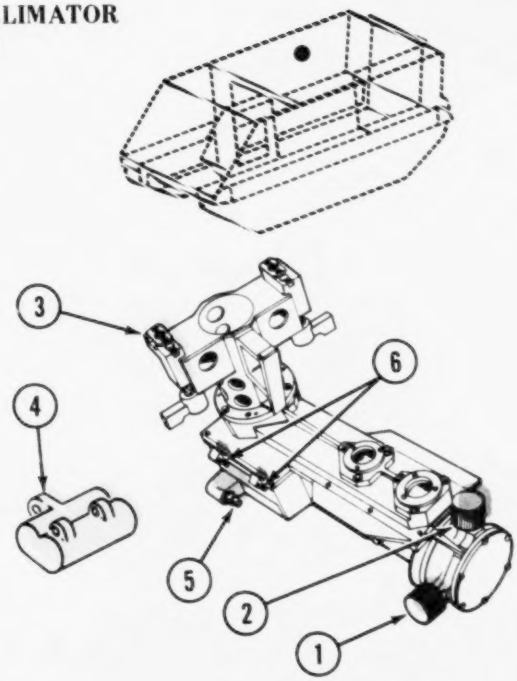
NOTE

The basic load of missiles is carried in the missile rack on the right wall of the vehicle.

Key	Control or Indicator	Function
1	Dust Cover	Protects electrical connector. Remove before loading.
2	Indexing Lugs (2). (Opposite side not shown.)	Act as guide when loading tube into launcher.
3	Quick Release Clamp	Allows handling ring to be removed. It is lockwired for shipment and storage.
4	Humidity Indicator	Indicates if missile has been exposed to excessive humidity.

TA 159151

BORESIGHT COLLIMATOR CONTROLS AND INDICATORS



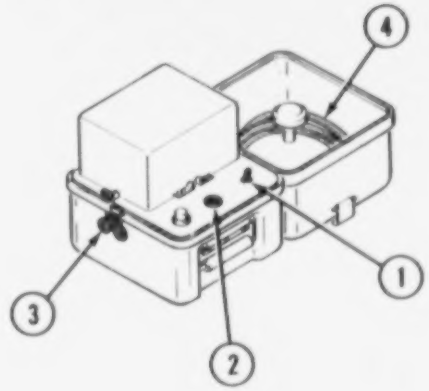
NOTE

Location shown is for storage. Collimator is used for on-vehicle boresighting and for boresighting of ground-emplaced TOW system.

Key	Control or Indicator	Function
1	Azimuth Adjustment Knob	Alines collimator to daysight/tracker in azimuth.
2	Elevation Adjustment Knob	Alines collimator to daysight/tracker in elevation.
3	Securing Latches	Secure boresight collimator to nightsight.
4	Battery (M901)	Powers collimator.
5	Boresight Collimator Connector	Provides electrical power connection to collimator (battery on M901, collimator power cable on M901A1).
6	Battery Latches (M901)	Secures battery to collimator.

TA 159152

NIGHTSIGHT BATTERY POWER CONDITIONER CONTROLS AND INDICATORS (M901A1)



Key	Control or Indicator	Function
1	Circuit Breaker	Turns nightsight battery power conditioner on and protects it against overload.
2	Connector	Connector for nightsight battery power conditioner output cable.
3	Latch	Secures cover of nightsight battery power conditioner to bottom of case.
4	Output Cable	Cable for connecting the output of the nightsight battery power conditioner to the input of the nightsight.

TA 159153

SECTION II. PREVENTIVE-MAINTENANCE CHECKS AND SERVICES (PMCS)

MAINTENANCE FORMS AND RECORDS

Every mission begins and ends with the paperwork. There isn't much of it, but you have to keep it up to date. The forms and records you fill out have several uses. They are a permanent record of the services, repairs, and modifications made on your vehicle. They are reports to organizational maintenance and to your commander. They are also a checklist for you when you want to know if anything went wrong when your vehicle was last used. Also, these records will tell whether the faults, if any, have been fixed. For the information you need on forms and records, see TM 38-750.

PREVENTIVE-MAINTENANCE CHECKS AND SERVICES

1. Do your before (B) PREVENTIVE-MAINTENANCE before you operate the vehicle. Pay attention to the CAUTIONS and WARNINGS. Before operation checks start on page 2-64 for the vehicle and page 2-102.56 for the gunner's station and turret.

2. Do your during (D) PREVENTIVE-MAINTENANCE during operation of vehicle. During operation checks means to watch, feel, and listen to the vehicle and its related components while they are actually being operated. During operation checks start on page 2-90 for the vehicle and page 2-102.64 for the gunner's station and turret.

3. Do your after (A) PREVENTIVE-MAINTENANCE right after operating the vehicle. Pay attention to the CAUTIONS and WARNINGS. After operation checks start on page 2-102.8 for the vehicle.

NOTE

All the tasks with a lesser time interval must be done before doing your weekly, monthly, or quarterly PMCS steps.

4. Do your weekly (W) PREVENTIVE-MAINTENANCE once a week or if you are operating the vehicle for the first time. Weekly operation checks start on page 2-102.19 for the vehicle and page 2-102.69 for the gunner's station and turret.

5. Do your monthly (M) PREVENTIVE-MAINTENANCE once a month. Monthly operation checks start on page 2-102.46 for the vehicle and page 2-102.73 for the gunner's station and turret.

6. Do your quarterly (Q) PREVENTIVE-MAINTENANCE before your carrier is turned over to organizational maintenance for its scheduled service. Quarterly PMCS checks start on page 2-102.52 for the vehicle.

TA 158982

7. If something doesn't work, troubleshoot it with the instructions in this manual. See page 3-2.

8. And always do your PREVENTIVE-MAINTENANCE in the same order. This is so it will get to be a habit. Once you've had some practice, you will quickly spot anything wrong.

   If anything looks wrong and you can't fix it, fill out your DA Form 2404 and present this form with your report to organizational maintenance RIGHT NOW!

INSPECTION FOR LEAKS

You need to know how fluid leaks affect your vehicle. The following are definitions of the types or "classes" of leaks. You must know them to determine the status of your carrier. Learn them. Become familiar with them. And REMEMBER–WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR.

Class 1. A Class 1 leak is a leak that causes discoloration or wetness, but the leak is not great enough to form drops. This is called "seepage".

Class 2. A Class 2 leak is a leakage of fluid great enough to form drops, but not great enough to cause the drops to drip from the item being checked.

Class 3. A Class 3 leak is a leakage of fluid great enough to form drops that drip or flow from the item being checked. A Class 3 leak will often cause a puddle that can be easily spotted.

CAUTION

Equipment can be operated with minor leaks such as Class 1 or Class 2 leaks. But operators who spot Class 1 or Class 2 leaks must consider the fluid capacity of the leaking item or system being checked. WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR. If it is okay to operate with Class 1 or Class 2 leaks, make sure you maintain fluid levels as required in your PMCS. Your vehicle should NOT BE OPERATED if it has a Class 3 leak. Class 3 leaks should be reported to your supervisor or to organizational maintenance AS SOON AS POSSIBLE. Damage could result to the equipment.

NOTE

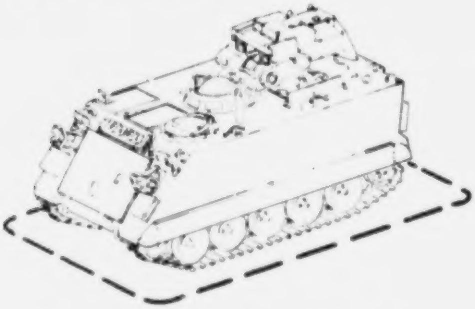
The above caution is applicable unless specified otherwise in the PMCS table.

TA 158983

PREVENTIVE-MAINTENANCE CHECKS AND SERVICES

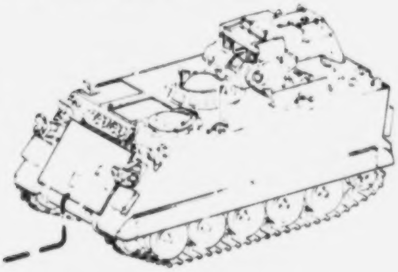
BEFORE YOU GET GOING . . .

Inspect For Leaks



Most vehicles are padlocked. Before you can begin your PMCS, unlock the vehicle and enter it.

Unlock Power Plant Door



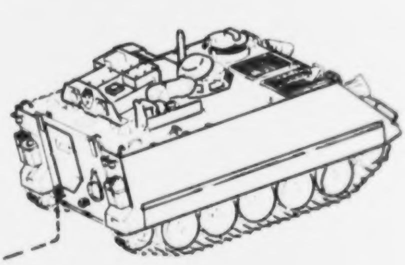
WARNING

Area behind vehicle must be clear before lowering ramp.

Now lower the vehicle ramp. This will make your PMCS flow easier. It will eliminate needless climbing in and out of the vehicle. This will also provide natural light for your inside checks.

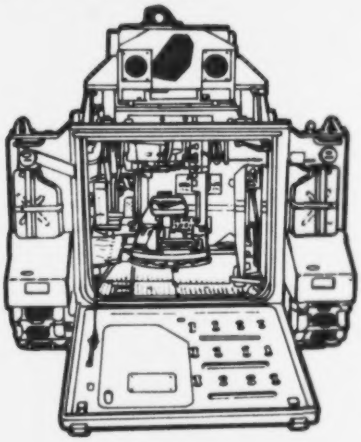
Take a quick walk-around. Be alert. Look for obvious leaks, damage, or missing parts. If trouble is clearly present, go directly to the PMCS step on the damaged item.

Open and Enter Vehicle



First make sure the vehicle's brakes are set and locked. Then unlock the power plant front access door.

Lower Rear Ramp



When you do your PREVENTIVE-MAINTENANCE, take along the tools you need to make all the checks. You always need a rag or two and an adjustable wrench to tighten loose fittings.

TA 158984

PREVENTIVE-MAINTENANCE CHECKS AND SERVICES

COMMON PMCS PRACTICES

There are some items that need to be checked that are common to all parts of the vehicle. Keep your wrench and rag handy and check these items each time you do your (B) Before PREVENTIVE-MAINTENANCE.

WARNING

Dry cleaning solvent (SD-2), item 8, Appendix D, is an explosive and toxic fluid. Do not breathe in fumes. Avoid contact with your skin. Do not use near open flame or excessive heat. The flash point temperature of dry cleaning solvent is very low (138°F).

KEEP IT CLEAN: Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. While doing your PMCS, clean as you work and as needed. Use dry cleaning solvent (SD-2), item 8, Appendix D, on all metal surfaces. Use soap and water when you clean rubber or plastic material.

BOLTS, NUTS, AND SCREWS: Check them all for obvious looseness or missing, bent, or broken condition. You can't try them all with a tool, but you can look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it, and report it to organizational maintenance.

WELDS: Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to organizational maintenance.

ELECTRIC WIRING AND CONNECTIONS: Look for cracked or broken wires, bare wires, and loose or broken connectors. Tighten loose connectors and make sure the wires are in good shape.

HOSES AND FLUID LINES: While doing your PMCS, look for wear, damage, and leaks in all hoses and fluid lines. Make sure clamps and fittings are tight. Wet spots mean leaks. A stain around a fitting or connector can mean a leak. Look for those tell-tale signs. And if a leak comes from a loose fitting or connector that can be easily fixed, tighten it. If you can't easily fix it or if a hose or line appears broken or worn out, report it to organizational maintenance.

MOUNTED ACCESSORIES: Inspect that mounted accessories are secure and in place before you begin to operate your vehicle.

NOTE

Keep all of the above general checks in mind every time you do your PMCS. This will help you spot trouble before it starts. It will also help you and your unit's organizational maintenance to keep your vehicle operational. In time, spotting possible trouble will become automatic.

TA 158985

PREVENTIVE-MAINTENANCE CHECKS AND SERVICES

When you inspect for GOOD CONDITION: You look at the item to see if it is safe and serviceable.

When you inspect for CORRECT ASSEMBLY OR STOWAGE: You look at the item to see if it is present, installed correctly, and securely.

The PREVENTIVE-MAINTENANCE starts on the next page. It is set up so you can make your before-operation checks as you walk around your carrier. PREVENTIVE-MAINTENANCE is planned as a job for the crew.

When you do your PREVENTIVE-MAINTENANCE, look for items that appear in the blocks "Equipment is not ready". If any of these faults are noted, do not operate your carrier until the repairs are made.

NOTE

Numbers used in the "locator" view at the top of your PMCS chart correspond to the step and item being checked. The top view will help locate the item on or in your vehicle. The illustration within the PMCS table will provide a close-up picture of that item. Numbers used in the PMCS text refer only to callouts on the close-up picture.

All vehicle PMCS are contained on pages 2-64 through 2-102.55. All gunner's station and turret PMCS are contained on pages 2-102.56 through 2-102.77.

TA 158986

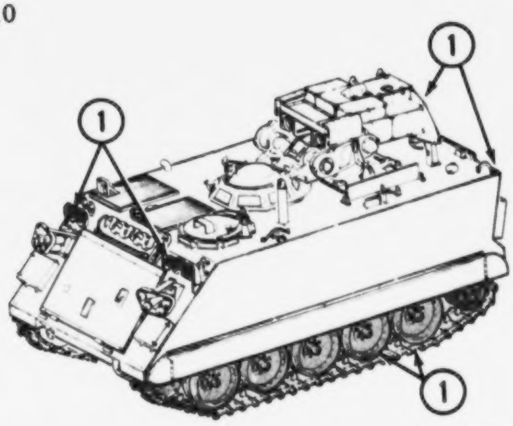


Table 2-1. Preventive Maintenance Checks and Services

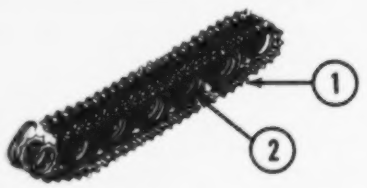
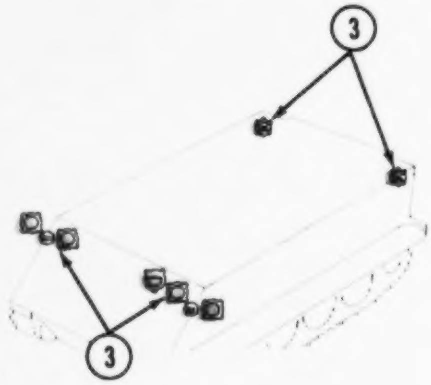
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						VEHICLE **WARNING** **Make certain vehicle brakes are set and locked or vehicle is blocked before performing your PMCS.** **NOTE** **Perform PMCS steps 1 through 25 weekly as well as before if:** • **You are the assigned operator but have not operated the vehicle since your last weekly inspection.** • **You are operating the vehicle for the first time.**	

TA 158987

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
	●					VEHICLE EXTERIOR (GROUND)   Inspect for damaged or missing items. Inspect tracks (1), roadwheels (2), and lighting fixtures (3). Make sure all stowed items (water cans, spare track shoes, shovel) are properly secured to the vehicle for travel. • Secure stowed items. • Replace missing items. • Report obvious major damage of tracks (1), roadwheels (2), and lighting fixtures (3) to organizational maintenance. • Report minor damage after operation.	Major damage to tracks and/or roadwheels.

TA 158988

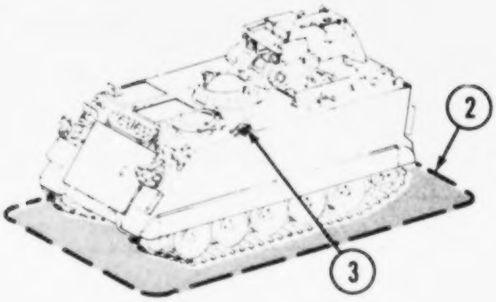
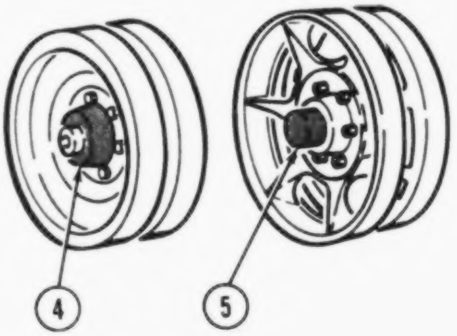


Table 2-1. Preventive Maintenance Checks and Services — Continued

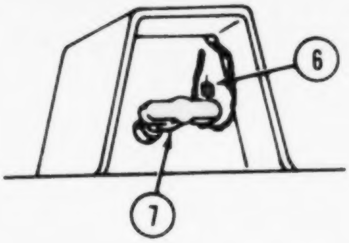
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
2	●					EXTERIOR LEAKS (GROUND)  Inspect vehicle roadwheel hubs (4) and idler wheel hubs (5) for leakage. Check beneath vehicle for loose or missing hull access and drain plugs (five plugs). • Report Class 1 and Class 2 leaks after operation. • Tighten loose hull access and drain plugs. Report missing plugs to organizational maintenance RIGHT NOW!	Any Class 3 leak evident. One or more hull access or drain plugs missing.

TA 158989

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
3	●					EXTERIOR PULL HANDLE (FIXED FIRE EXTINGUISHER)  Visually inspect seal and locking wire (6) on exterior pull handle (7). • Make sure seal or locking wire (6) is not broken. • Report broken seal or locking wire (6) to organizational maintenance.	Seal or locking wire (6) missing or broken.

TA 158990

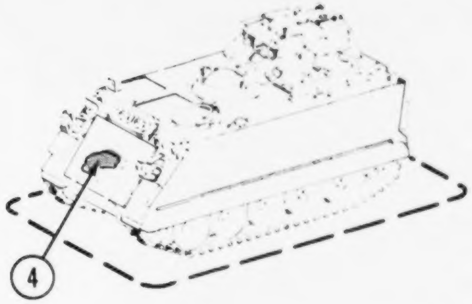
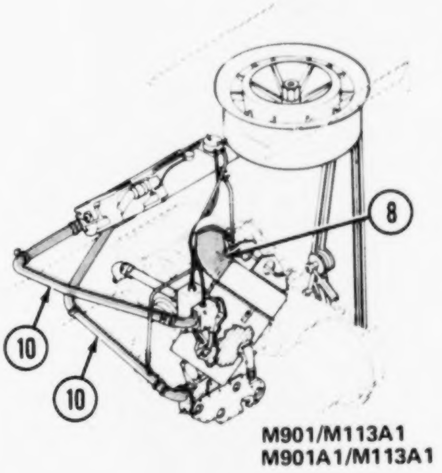


Table 2-1. Preventive Maintenance Checks and Services — Continued

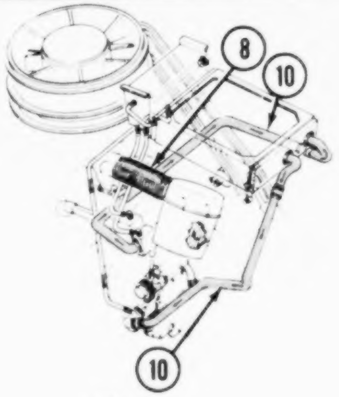
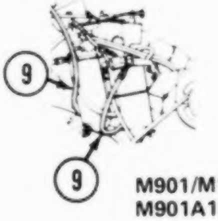
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
4	●					ENGINE COMPARTMENT (FRONT ACCESS) 	

TA 159154

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						  M901/M113A2 M901A1/M113A2 **CAUTION** **Make sure you inspect all flexible air intake ducts (8) for damage. Do not operate the vehicle with any holes or tears in the flexible ducting (8). Damage to the engine could result.** Check inside front access engine compartment for leaks. Inspect air intake ducting (8), fuel lines (9), and coolant hoses (10) for signs of damage and security of fittings. • Tighten loose fittings. • Report damaged lines and holes to organizational maintenance.	Class 3 leak present. Any holes or tears in flexible air intake ducts.

TA 159155

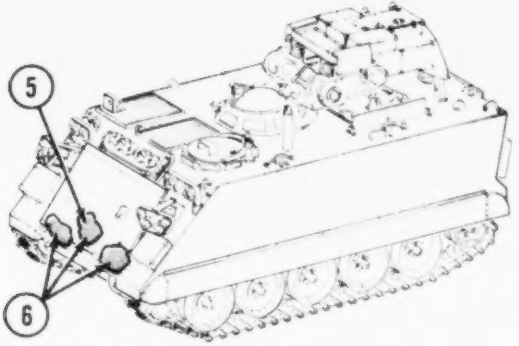
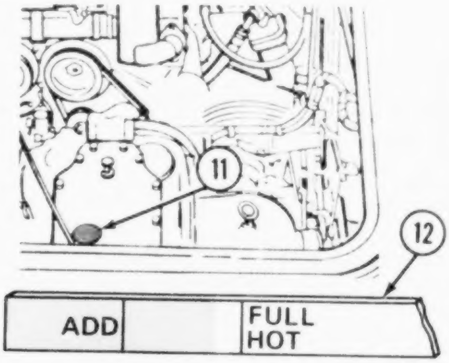


Table 2-1. Preventive Maintenance Checks and Services — Continued

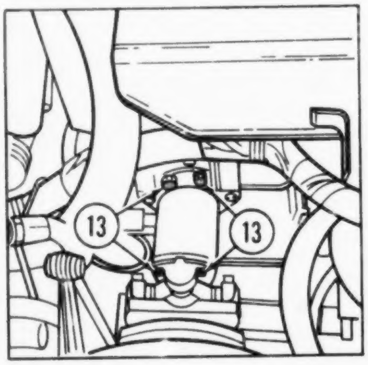
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
5	●					DIFFERENTIAL OIL LEVEL (COLD CHECK)  **CAUTION** **Make sure differential filler cap (11) is closed tight after oil level inspection. During operation, pressure is built up in the differential which could force the oil out and damage to the differential could result.**	

TA 158993

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						NOTE **If engine has been running, wait 10 or 15 minutes after stopping engine before checking the differential oil level.** Check differential oil level. • Oil level on the dipstick (12) should be between the ADD and FULL range. • Add oil as needed. Do not overfill. Oil level between ADD and FULL is OK on a cold check. (See LO 9-2350-259-12.)	No presence of oil on dipstick.
6	●					UNIVERSAL JOINTS (THREE LOCATIONS)  Visually inspect bolts on universal joints (13) for obvious signs of looseness.	Any bolts loose or missing.

TA 158994

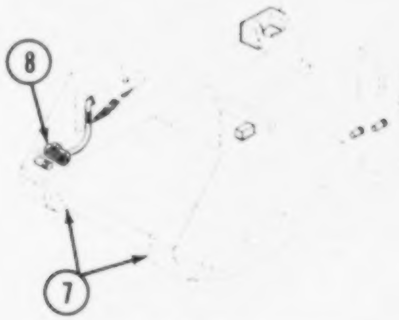
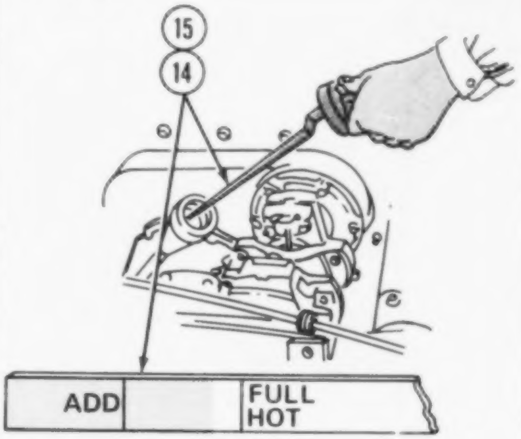


Table 2-1. Preventive Maintenance Checks and Services — Continued

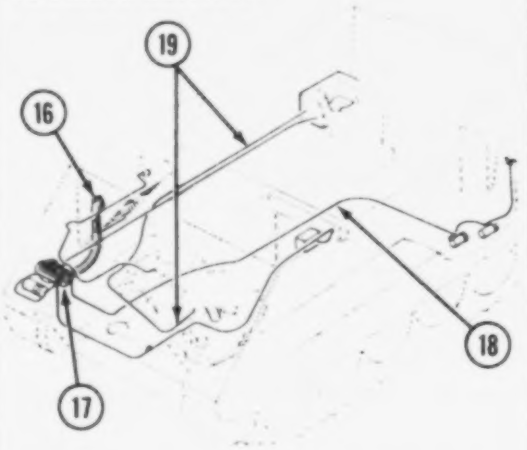
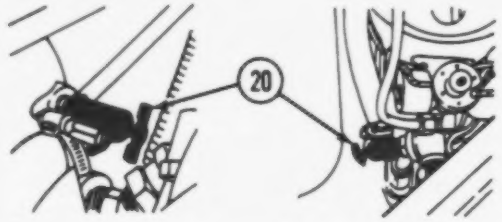
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
7	●					FINAL DRIVE OIL LEVELS (COLD CHECK)  Check oil levels of the left and right final drives. • Oil level of the left final drive dipstick (14) and the right final drive dipstick (15) should be between ADD and FULL. • Add oil as needed. Do not overfill. (See LO 9-2350-259-12.)	No presence of oil on dipstick (14) or (15).

TA 158995

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
8	●					COOLANT HEATER*   Check to make sure nothing is blocking the coolant heater exhaust (16) or air inlet (17). • Inspect for leaks in fuel lines (18) and coolant lines (19). • Make sure the coolant valves (20) are open. *Skip this check if coolant heater will not be used during operation.	Class 3 fuel leak. Class 3 coolant leak.

TA 158996

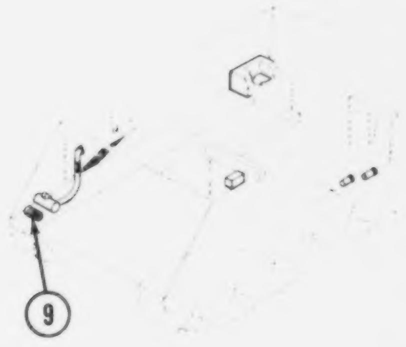
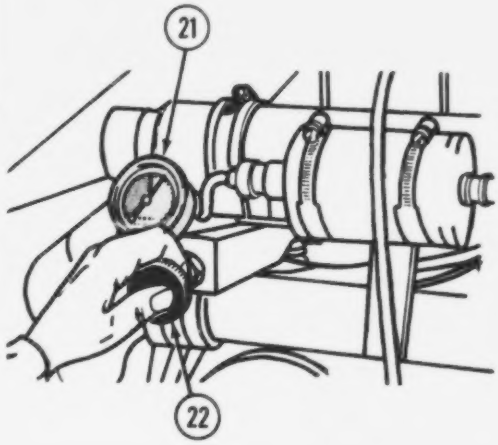


Table 2-1. Preventive Maintenance Checks and Services — Continued

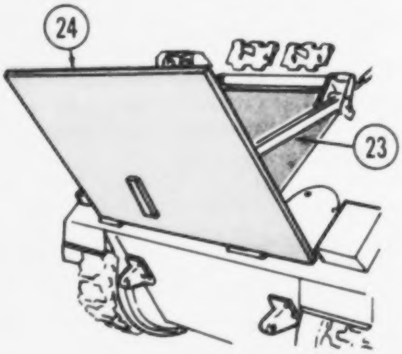
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M	Check for and have repaired or adjusted as necessary	
9	●					AIRBOX HEATER ACCUMULATOR (BELOW 40°F (4.44°C) ONLY)  **NOTE** **Skip this check if your vehicle has the electrical air pump.**	

TA 158997

Table 2-1. Preventive Maintenance Checks and Services — Continued

B —Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						Check the accumulator pressure gage (21) each day before you use the airbox. If the gage (21) reads in the red zone, use the hand pump (22) to pump up the system. Keep pumping until the gage (21) reads in the yellow zone. If the gage (21) reads in the green mark on the red zone, you've lost precharge pressure. If so, notify organizational maintenance.  **WARNING** **Make sure the engine compartment front access cover (23) and trim vane (24) are properly closed and secure before continuing your PMCS. Carbon monoxide could enter into the vehicle.**	

TA 158998

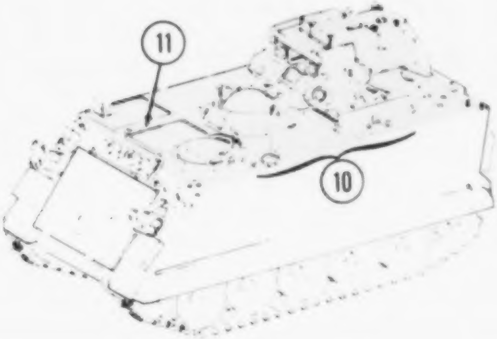
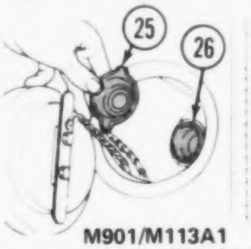
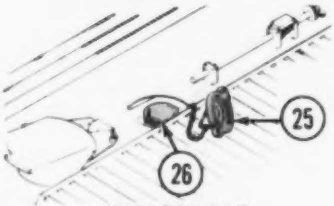


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
10	●					VEHICLE EXTERIOR (ON-DECK) Inspect for damaged or missing items. Make sure all stowed items are properly secured for travel. See Appendix F for correct stowage of on-deck accessories. • Secure all stowed items for travel. • Report damaged items after operation.	
11	●					COOLANT LEVEL  M901/M113A1 M901A1/M113A1  M901/M113A2 M901A1/M113A2	

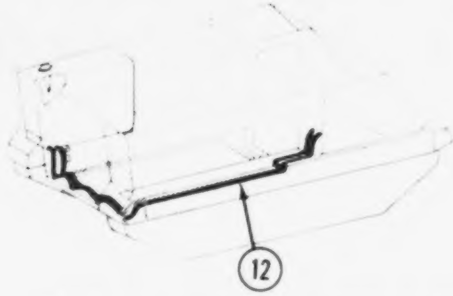
TA 159156

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						WARNING **Check the coolant level when the engine is cold. Never try to check the coolant level after the vehicle has been running and the engine is still hot.** **On M901/M113A1 and M901A1/M113A1, remove radiator cap (25). Visually check that coolant level is up to the bottom of the radiator filler neck (26).** • Add coolant as necessary. • If you find the coolant level way below the filler neck, inspect all radiator hoses for leaks. Report any leakage to organizational maintenance. • Inspect radiator cap (25) for obvious damage and fit. Cap should be in good condition and seal tightly in place. • Notify organizational maintenance if cap (25) is damaged or missing. **On M901/M113A2 and M901A1/M113A2, remove radiator cap (25). Visually check that coolant level is within 1/2 inch of the radiator filler neck (26). Report any leakage to organizational maintenance.**	Coolant system Class 3 leak. Cap (25) missing.

TA 159157



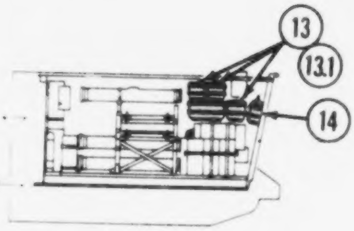


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

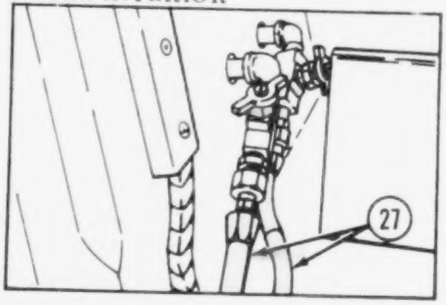
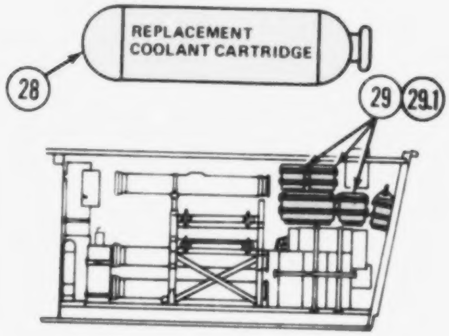
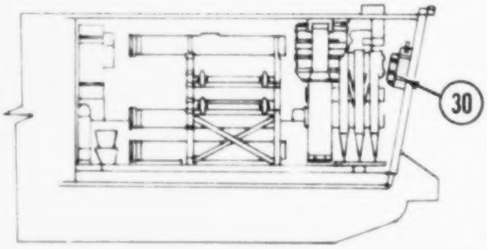
ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
12	●					VEHICLE INTERIOR  Inspect vehicle fuel lines (27) for leaks. Report any leak to organizational maintenance.	Class 3 fuel leak.
13	●					NIGHTSIGHT COOLANT (M901 only)  REPLACEMENT COOLANT CARTRIDGE 28 29 29.1	

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						Inspect for serviceability of 15 bottles (28) and 3 cases (29) (M901). • Check nightsight coolant cases for presence and condition. Depleted coolant bottles should not be in case.	5 bottles are not charged and on hand.
13.1	●					SPARE NIGHTSIGHT POWER CONDITIONER BATTERIES (M901A1) Inspect spare nightsight power conditioner batteries (29.1) (M901A1). • Check spare nightsight power conditioner batteries for presence and condition.	Spare batteries must be in unopened plastic overwrap and must not be past the expiration date of the batteries.
14	●					NIGHTSIGHT BATTERIES (M901)  Inspect nightsight battery case (30) to ensure that cases are complete and can be mounted to brackets on bulkhead. • Check table to ensure battery has been charged within the last 30 days.	All 5 of the batteries have not been charged within the last 30 days.

TA 159159

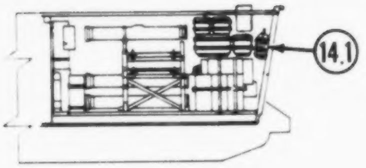
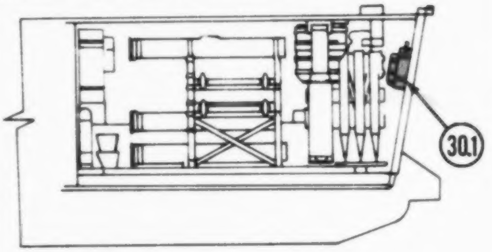


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
14.1	●					NIGHTSIGHT BATTERY POWER CONDITIONER (M901A1)  • Check nightsight battery power conditioner (30.1) for dents, cracks or other damage that might prevent proper operation. • Check that the nightsight battery power conditioner contains two batteries. • Check for two spare batteries in unopened overwrap that are within expiration date stamped on batteries.	Nightsight battery conditioner is not serviceable. Batteries not installed. Batteries are not available or shelf life has expired.

TA 159160

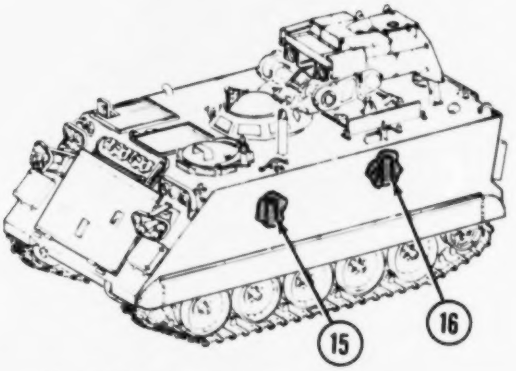
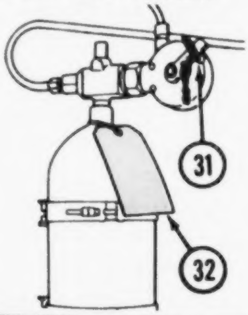


Table 2-1. Preventive Maintenance Checks and Services — Continued

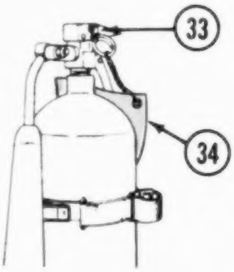
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
15	●					FIXED FIRE EXTINGUISHER  **WARNING** **Do not operate your vehicle if the portable or fixed fire extinguisher is missing or if either one has been discharged as indicated by a broken or missing locking wire and seal.** Check fixed fire extinguisher control seal (31) and inspection card (32). • Make sure seal (31) or locking wire is not broken.	Extinguisher missing. Seal or locking wire missing or broken.

TA 159003

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	**For readiness reporting, equipment is not ready/ available if**
	B	D	A	W	M		
						• Ensure that card (32) is up to date and indicates extinguisher has been inspected by organizational maintenance in the past 90 days. • Report broken seal (31) or outdated card to organizational maintenance.	
16	●					PORTABLE FIRE EXTINGUISHER  Check portable fire extinguisher control seal (33) and inspection card (34). • Make sure seal (33) or locking wire is not broken. • Ensure that card (34) is up to date and indicates extinguisher has been inspected by organizational maintenance in the past 90 days. • Report broken seal (33) or outdated card (34) to organizational maintenance.	**Extinguisher missing. Seal or locking wire missing or broken.**

TA 159004

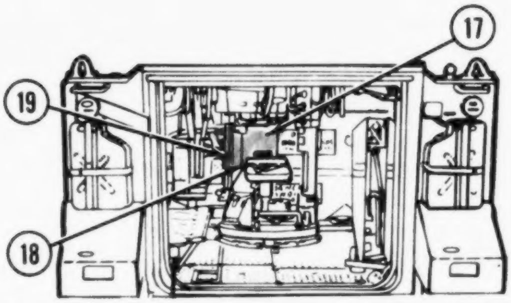
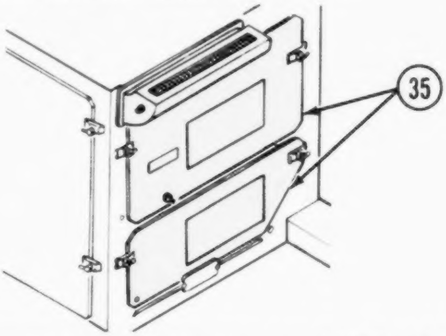
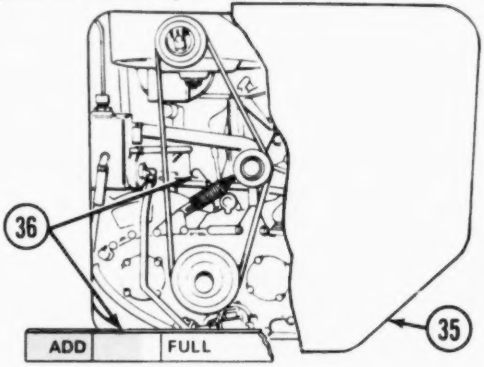


Table 2-1. Preventive Maintenance Checks and Services — Continued

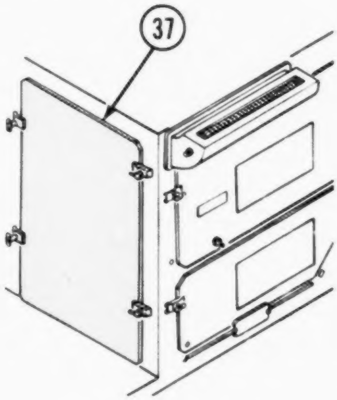
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
17	●					REAR ENGINE COMPARTMENT  Remove rear engine access panel (35) and inspect for any obvious signs of leakage. Report Class 1 and Class 2 leaks after operation.	Class 3 leak evident.
18	●					TRANSFER GEARCASE OIL LEVEL (COLD CHECK)  	

TA 159005

Table 2-1. Preventive Maintenance Checks and Services — Continued

B— Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						Check transfer gearcase oil level. • Oil level on transfer gearcase dipstick (36) should be between ADD and FULL. • Add oil as needed (See LO 9-2350-259-12). **WARNING** **Make certain rear engine access panel (35) is reinstalled and secured before continuing your PMCS. Carbon monoxide could enter into the vehicle compartment.**	No presence of oil on dipstick.
19	●					OPERATOR'S ENGINE COMPARTMENT  Remove operator's engine access panel (37) and inspect for any signs of leakage. Report Class 1 and Class 2 leaks after operation.	Class 3 leak evident.

TA 159006

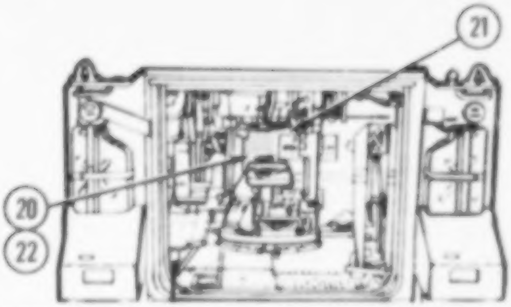
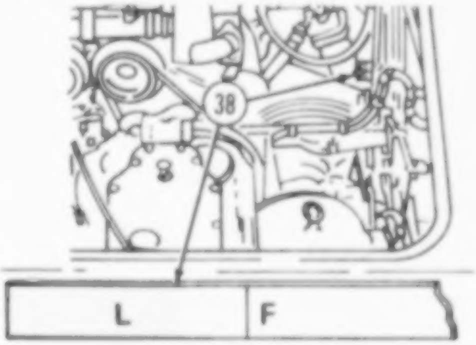


Table 2-1. Preventive Maintenance Checks and Services — Continued

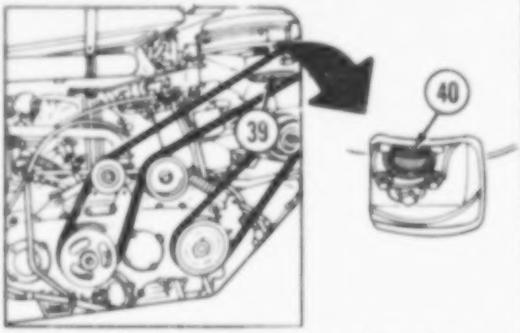
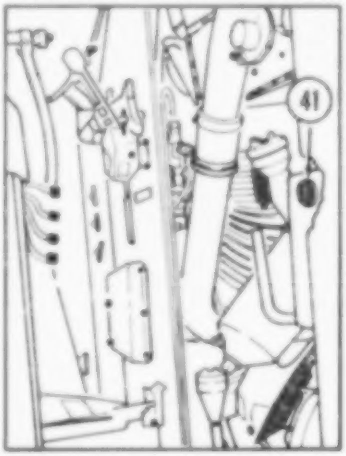
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
20	●					ENGINE OIL LEVEL (COLD CHECK)  **CAUTION** **Vehicle must be on level surface for proper oil reading. Improper oil level could result in damage to engine.** Check engine oil level. • Oil level on engine dipstick (38) should be between L (Low) and F (Full). • Add oil as needed. Do not overfill. Oil level between L and F is OK on a cold check. Oil level should not be above F mark. (See LO 9-2350-259-12.)	No presence of oil on dipstick.

TA 159007

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
21	●					FAN GEAR BOX OIL LEVEL  Check oil level on fan gear box (39). Oil level should be between ADD and FULL marks on the sight glass indicator (40). Add oil as needed. (See LO 9-2350-259-12.)	
22	●					RAMP HYDRAULIC FLUID LEVEL  Check ramp hydraulic fluid level with the ramp down. Fluid must be visible in the ramp hydraulic fluid level sight glass (41). Notify organizational maintenance if fluid is not visible in the sight glass (41) when ramp is down.	

TA 159008

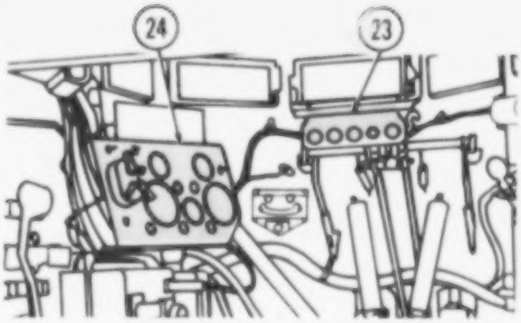
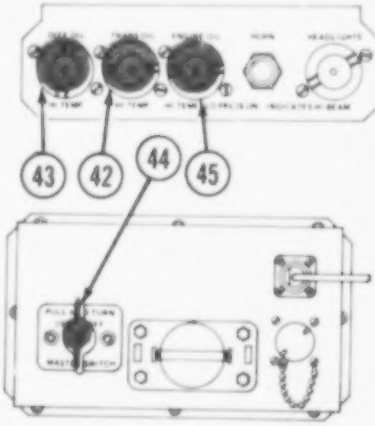


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
23	●					INSTRUMENT PANEL WARNING LIGHTS Check for presence and/or damage of instrument panel warning lights. • Check that transmission HI-TEMP warning light (42) and differential HI-TEMP light (43) are present and bulbs are not broken. • Now turn on the master switch (44) and check that engine oil warning light (45) comes on.  HORN HEADLIGHTS HI TEMP HI TEMP 43 42 44 45 PULL AND TURN MASTER SWITCH	Any warning light (42, 43, or 45) missing or bulb broken. Engine low pressure warning light (45) does not come on after turning on master switch (44).

TA 159009

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly S — Semi-Annual

ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M	S		
23.1	●						STEERING AND BRAKING CONTROLS WARNING **When vehicle is moving, pushing down on steering lever lock buttons can cause brake(s) to be locked. Personnel can be killed or injured. Perform steering and braking PMCS only when the engine is stopped.** WARNING **When steering and braking occurs before 1st notch or after 4th notch on the quadrant, vehicle can skid and crash, personnel can be killed or injured. If steering and braking is not between 2nd notch and 3rd notch, do not operate vehicle, notify organizational maintenance.** WARNING **If left and right steering levers position are not within one notch difference when both are pulled to the fully applied position, vehicle can skid and crash, personnel can be killed or injured. Do not operate vehicle, notify organizational maintenance.**	

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly S — Semi-Annual

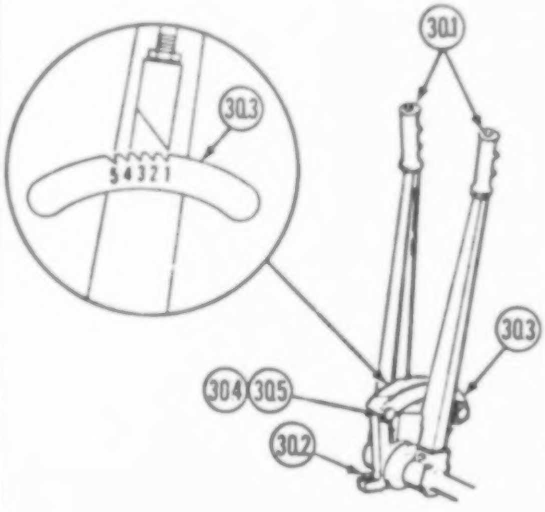
ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M	S		
23.1	●						STEERING AND BRAKING CONTROLS (cont.) • Inspect for proper installation of steering lever assemblies (30.1). — Make sure mounting bracket screws (30.2) are tight. — Make sure quadrants (30.3) are securely mounted and screws (30.4) and nuts (30.5) are tight. • Inspect for proper operation of steering levers (30.1). 	Any screws (30.2) and (30.4) or nuts (30.5) are loose or missing. Quadrants (30.3) loose, missing, or binding

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly S — Semi Annual

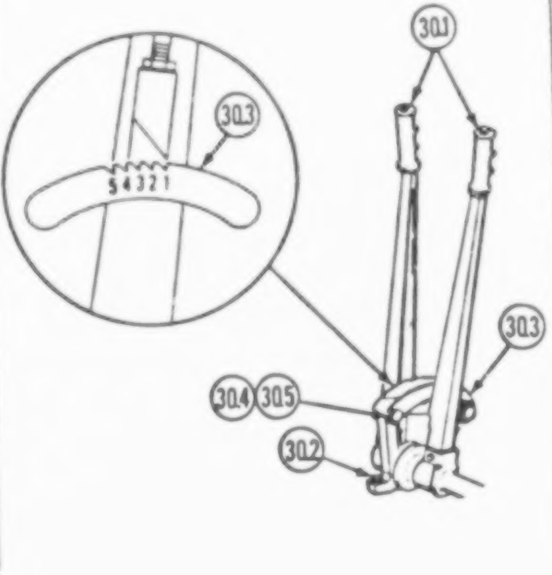
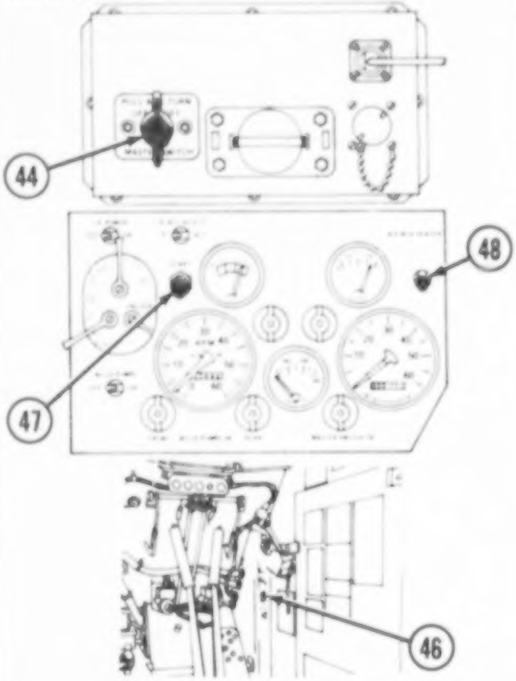
ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M	S		
21.1	●						STEERING AND BRAKING CONTROLS (cont.) • Unlock levers (30.1). • Push down on lock buttons and pull both steering levers (30.1) rearward. If they are properly adjusted, resistance will be felt in both levers between the 2nd and 3rd notches of the quadrants (30.3). • Unlock levers. Pull back levers and release levers several times. Get to know the feel of your carrier's steering levers. If your carrier's steering levers do not feel right to you, notify organizational maintenance.  	If resistance is felt at the first notch of quadrants (30.3). If resistance is not felt until levers are at the fourth notch of quadrants (30.3). If the difference between the left and right lever is greater than one notch when fully applied.

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
24	●					AIRBOX HEATER (BELOW 40°F (4.44°C) ONLY)  **NOTE** **Skip this check if your vehicle has the airbox heater accumulator (PMCS step 9).** With the master switch (44) still on, check the airbox heater as follows: • Pull the fuel shut-off (46). • Press the starter switch (47). • Turn the airbox heater (48) on.	

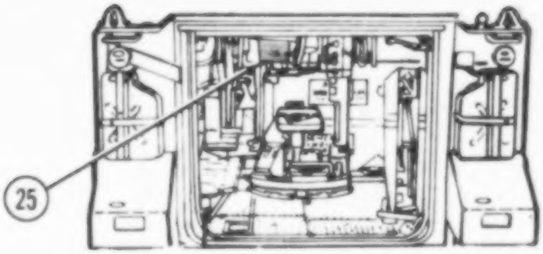
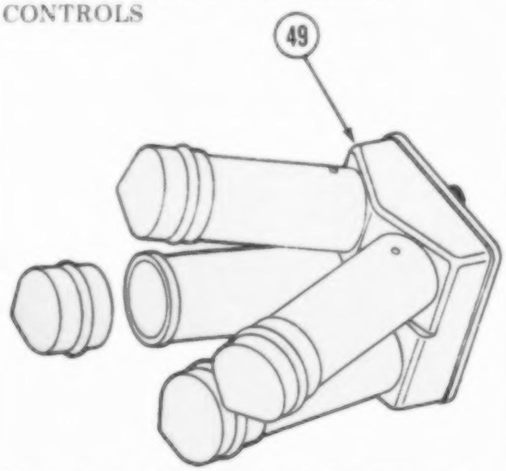


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						• Now look for puffs of black smoke from the engine exhaust. If you see smoke, the heater is OK. • Notify organizational maintenance if no smoke appears.	
25	●					SMOKE GRENADE LAUNCHER CONTROLS  Clean the smoke grenade arming firing unit (49). • Remove any buildup of grease or dirt by wiping with a soft cloth, item 6, Appendix D and dry cleaning solvent, item 8, Appendix D.	

TA 159011

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						• Wipe dry with a dry soft cloth, item 6, Appendix D. **WARNING** **Carbon monoxide gas is deadly poison. Make sure all power plant access panels are closed and vehicle is ventilated before starting the engine.** NOTE **D — During operation checks begin after the engine has been started. But before your vehicle is moved, perform PMCS steps 26 through 42.**	

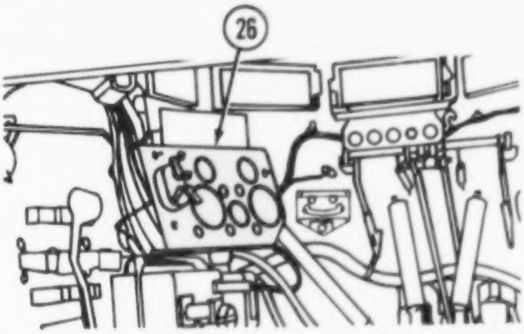


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

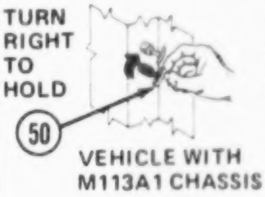
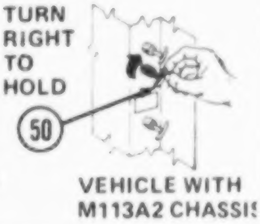
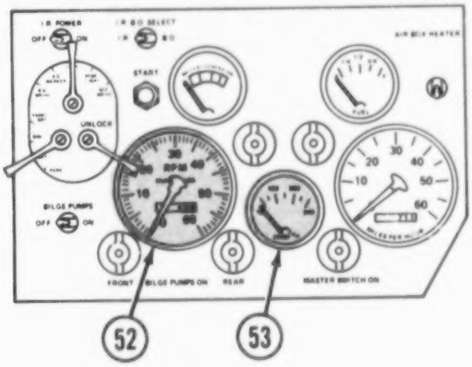
ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
26		●				TEMPERATURE, FUEL LEVEL, AND RPM GAGES  TURN RIGHT TO HOLD 50 VEHICLE WITH M113A1 CHASSIS  TURN RIGHT TO HOLD 50 VEHICLE WITH M113A2 CHASSI!  I R POWER OFF ON I R D D SELECT START UNLOCK AIR BOX HEATER FUEL RPM BILGE PUMPS OFF ON FRONT BILGE PUMPS ON REAR MASTER SWITCH ON 52 53	

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						Check these instrument panel gages: • With vehicle brakes set and locked, start engine in neutral position. (See page 2-103 for starting instructions.) • Set hand throttle (50) to run engine at 800 to 1000 rpm and allow engine to warm up for 3 to 5 minutes. Then release hand throttle (50). • Observe rpm gage (52) for proper operation and that normal idle speed is 650 to 700 rpm. Report abnormal idle speed to organizational maintenance. • Observe temperature gage (53) for proper operation and that normal coolant temperature is 160°F to 230°F (71.1°C to 110°C). **CAUTION** **If temperature goes above 230°F (110°C), turn off engine and notify organizational maintenance. Damage to the engine could occur.**	Engine fails to start in neutral. Temperature gage is missing or not working. RPM gage is inoperative or missing.

TA 159014

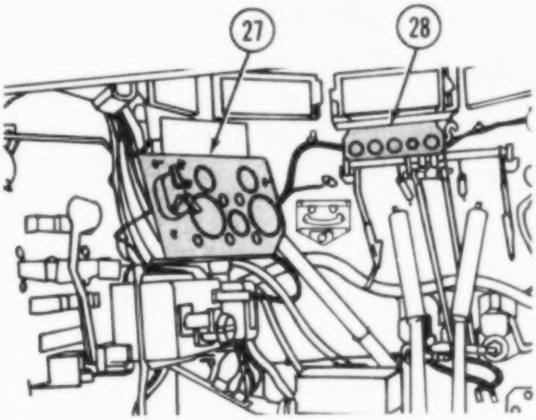
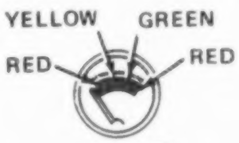
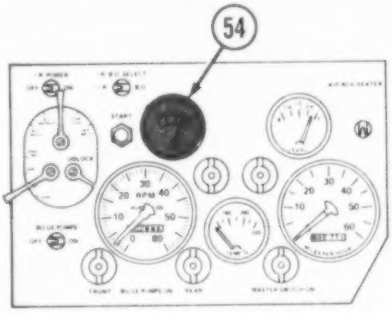


Table 2-1. Preventive Maintenance Checks and Services — Continued

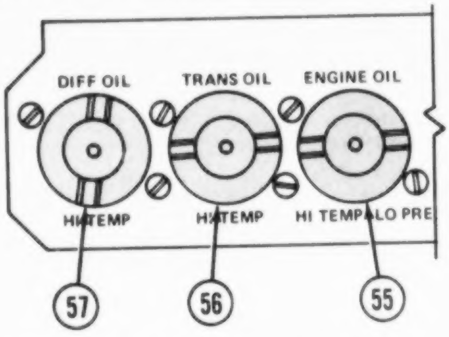
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
27		●				BATTERY GENERATOR GAGE   Check the battery generator gage (54) with the engine running. • Gage should read in the green zone. • Notify organizational maintenance if the gage (54) reads in the yellow or red zone.	Gage is not in the green zone.

TA 159015

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
28		●				INSTRUMENT PANEL WARNING LIGHTS  DIFF OIL TRANS OIL ENGINE OIL HI TEMP HI TEMP HI TEMP LO PRE 57 56 55 Check instrument panel warning lights. • Observe engine oil (55), transmission (56), and differential (57) warning lights for red warning indication. • If red light comes on, notify organizational maintenance.	Any oil warning light comes on.

TA 159016

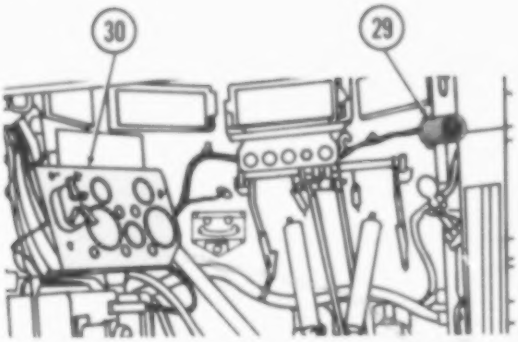
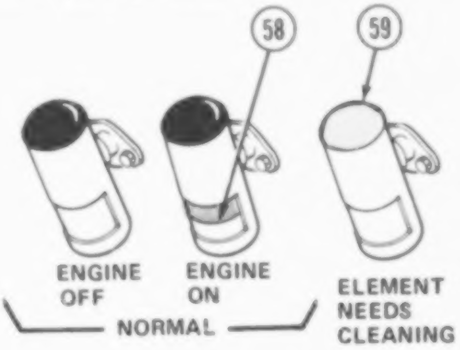


Table 2-1. Preventive Maintenance Checks and Services — Continued

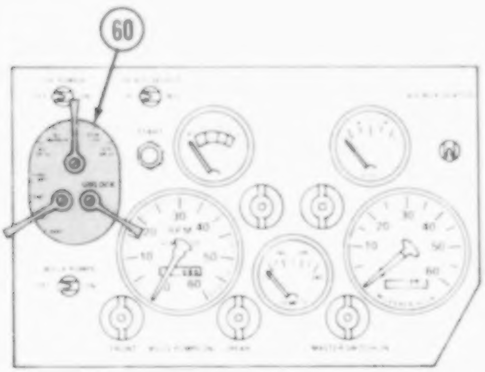
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
29		●				AIR CLEANER RESTRICTION INDICATOR (IF EQUIPPED)  58 59 ENGINE OFF ENGINE ON NORMAL ELEMENT NEEDS CLEANING Check the air cleaner restriction indicator with the engine running. • Observe air cleaner window (58). • If at any time the sleeve is locked up so you see only red in the window, clean the air cleaner element (page 3-51). • When the element is clean, press the rubber dome (59) to reset the air cleaner restriction indicator.	Air remains restricted after setting.

TA 159017

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						NOTE **If your vehicle is not equipped with an air cleaner restriction indicator, check element when engine seems to loose power or at any halt when vehicle is operating in extreme sand or dust.**	
30		●				HEADLIGHTS*  Check the driving lights by turning the main light switch (60) on. Make sure headlights work on high and low beam. *Check only if item is to be used during operation.	

TA 159018

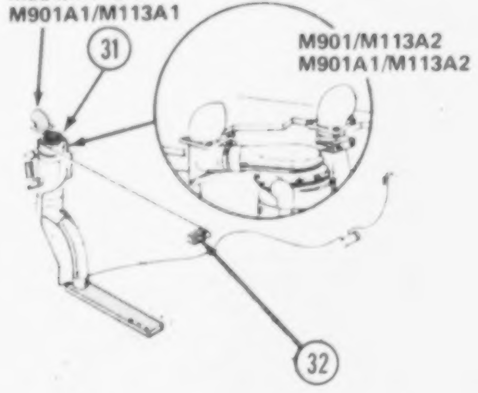
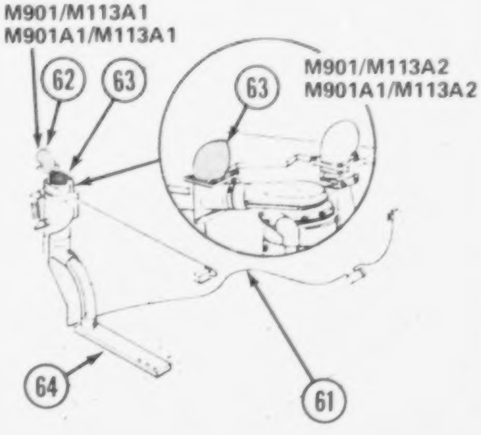

M901/M113A1
M901A1/M113A1
31
M901/M113A2
M901A1/M113A2
32

Table 2-1. Preventive Maintenance Checks and Services — Continued

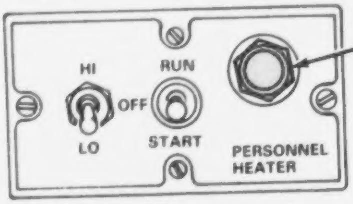
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
31		●				PERSONNEL HEATER*  M901/M113A1 M901A1/M113A1 62 63 63 M901/M113A2 M901A1/M113A2 64 61 **WARNING** **Do not operate personnel heater if a fuel leak of any kind is found in either the heater or fuel lines. Fire could result.**	

TA 159162

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						Check personnel heater and heater fuel lines. • Check for leaks in the fuel lines (61). Feel lines for wetness caused by fuel leakage, especially near connections. • Check to make sure nothing is blocking the personnel heater exhaust (62), air inlet (63), or heat ducts (64). • Do not use heater during operation if any fuel leak is found. • Notify organizational maintenance of leakage immediately after operation.	
32		•				PERSONNEL HEATER ELECTRICAL CIRCUITS*  Check the operation of the personnel heater electrical circuits. Push the PRESS-TO-TEST light cover, and see that the indicator light (65) comes ON before you start the heater. When you turn the heater OFF after operation, make sure the master switch remains ON and that blower keeps running until the heater cools down and indicator light (65) goes out. *Check only if item is to be used during operation.	

TA 159020

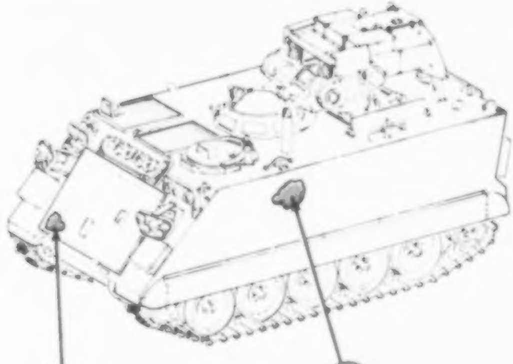
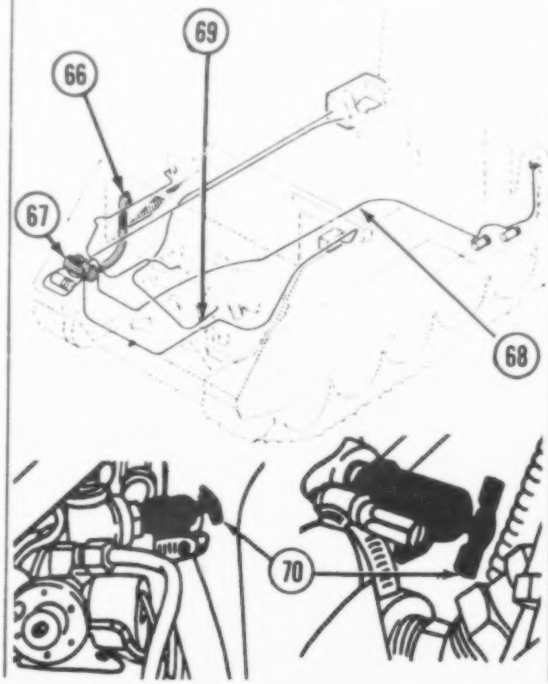


Table 2-1. Preventive Maintenance Checks and Services — Continued

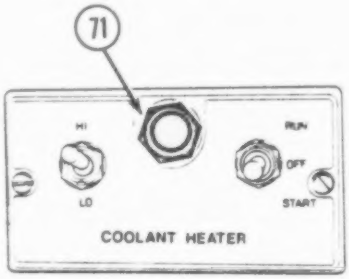
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
33		•				ENGINE COOLANT HEATER* 	

TA 159021

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						Check to make sure nothing is blocking the coolant heater exhaust (66) or air inlet (67). • Inspect for leaks in fuel lines (68) and coolant lines (69). • Make sure the coolant valves (70) are open before you start the heater.	Any fuel leak (Class 1, 2, or 3).
34		•				ENGINE COOLANT HEATER ELECTRICAL CIRCUITS*  Check the operation of the engine coolant heater electrical circuits. • Push the PRESS-TO-TEST light cover, and see that the indicator light (71) comes on before you start the heater. • When you turn the heater OFF, make sure the master switch is ON until the blower stops and the indicator (71) goes out. *Check only if item is to be used during operation.	

TA 159022

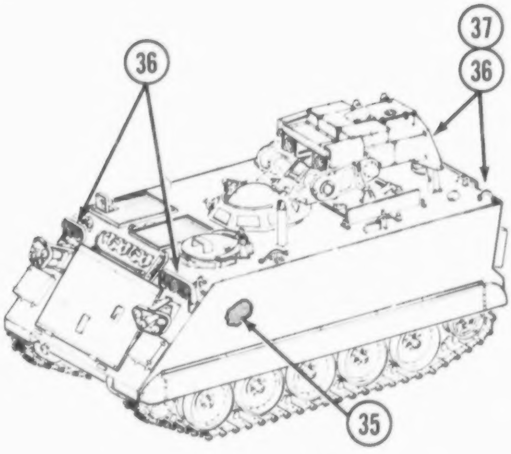
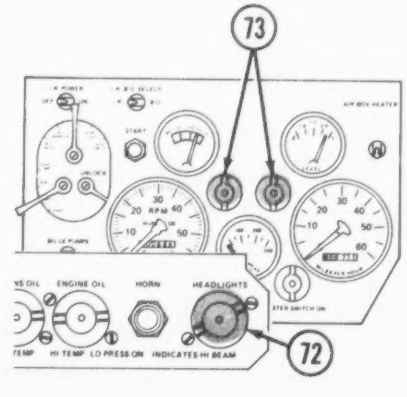


Table 2-1. Preventive Maintenance Checks and Services — Continued

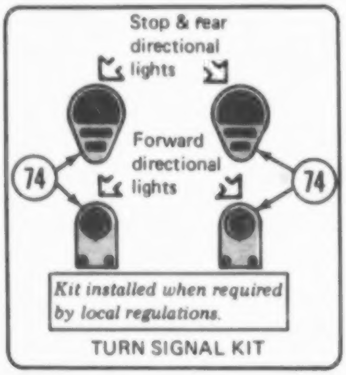
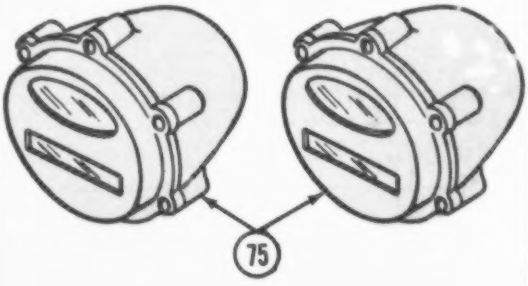
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
35		●				INSTRUMENT PANEL LIGHTS  73 HORN HEADLIGHTS ENGINE OIL INDICATES HI BEAM 72 **Check the high beam indicator light (72) and instrument panel lights (73) to make sure they are working.**	

TA 159023

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
36		●				TURN SIGNAL LIGHTS (IF EQUIPPED)  Stop & rear directional lights Forward directional lights 74 74 Kit installed when required by local regulations. TURN SIGNAL KIT Check that turn signals (74) work on both sides of the vehicle.	
37		●				STOPLIGHT-TAIL LIGHT  Check stoplight-tail lights (75) for proper operation. Make sure lights brighten during vehicle braking.	

TA 159024

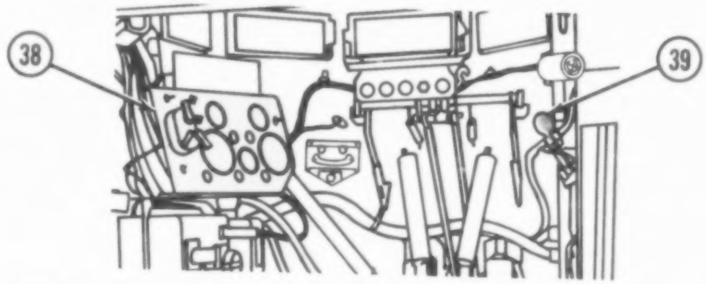
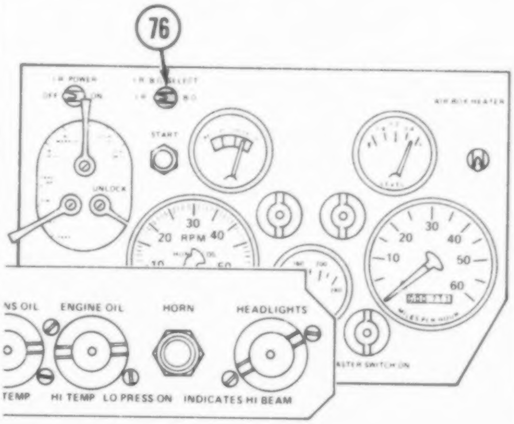


Table 2-1. Preventive Maintenance Checks and Services — Continued

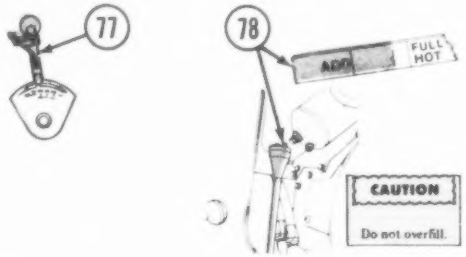
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
38						INFRARED LIGHTS*  76 I.R. POWER OFF ON I.R. B.O. SELECT I.R. B.O. AIR BOX HEATER START UNLOCK 30 20 RPM 40 10 50 30 20 40 10 50 60 MILES PER HOUR ENGINE OIL HORN HEADLIGHTS TEMP HI TEMP LO PRESS ON INDICATES HI BEAM MASTER SWITCH ON **WARNING** **Do not look directly into infrared lights. Damage to the eye could result.** Check infrared lights (76) on both high and low beam. Do this by HOLDING YOUR HAND OVER THE LENS. If light (76) is working, you will feel heat. *Check only if item is to be used during operation.	

TA 159025

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
39		●				TRANSMISSION OIL LEVEL (HOT CHECK)  **WARNING** **Make sure vehicle is on level surface and brakes are set and locked.** Check transmission oil level while engine is running at normal operating temperature (between 160°F and 230°F (71.1°C and 110°C)). • Put shift lever (77) in 2-3 range, and run the engine at 1000 rpm for 3 to 5 minutes. • Reduce engine speed to idle (650 to 700 rpm). • Now move the transmission shift lever (77) through all the ranges. • Put the shift lever (77) in neutral (N) and set the hand throttle to run the engine at 1500 rpm. • Check the transmission oil dipstick (78).	

TA 159026

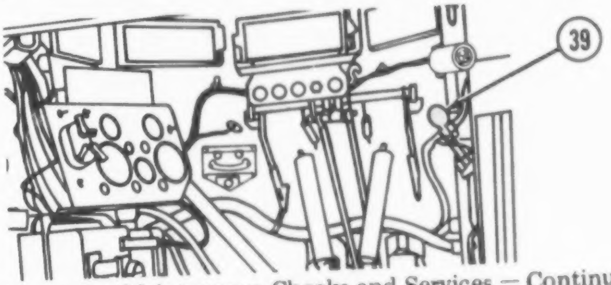
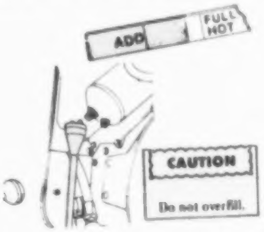


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						TRANSMISSION OIL LEVEL (HOT CHECK) (CONT)  Oil level should be between the ADD and FULL/HOT marks. Add oil as needed. (See LO 9-2350-259-12.) Vehicle may be safely operated when transmission oil level shows between ADD and FULL/HOT. **WARNING** **Reinstall and secure operator's engine access panel before getting underway. Carbon monoxide could enter into vehicle compartment.** NOTE **Push in hand throttle control and allow engine to return to normal idle (650 to 700 rpm) as soon as you complete this oil level check.**	

TA 159027

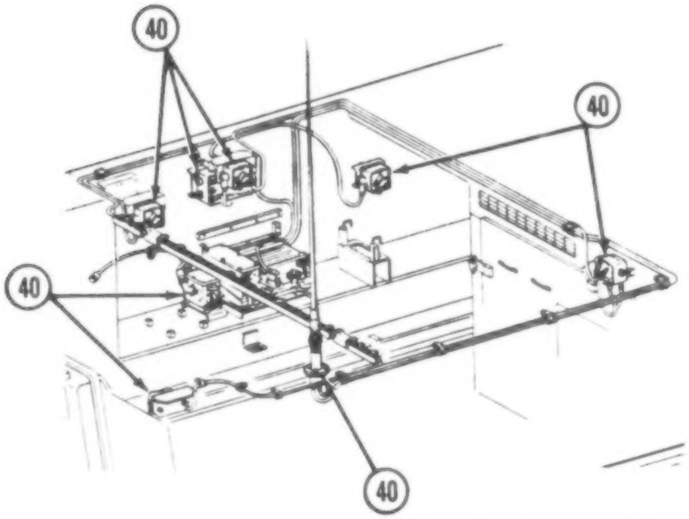


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
40		●				VEHICLE COMMUNICATIONS EQUIPMENT Check for proper operation. (See TM 11-5820-498-12 and/or TM 11-5820-401-10-2, as appropriate.)	No intercom between commander and driver.

TA 159028

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly S — Semi-Annual

ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M	S		
41		•					STEERING AND BRAKING CONTROLS **WARNING** When vehicle is moving, pushing down on steering lever lock buttons can cause brake(s) to be locked. Personnel can be killed or injured. Perform steering and braking PMCS only when the engine is stopped. **WARNING** When steering and braking occurs before 1st notch or after 4th notch on the quadrant, vehicle can skid and crash, personnel can be killed or injured. If steering and braking is not between 2nd notch and 3rd notch, do not operate vehicle, notify organizational maintenance. **WARNING** If left and right steering levers position are not within one notch difference when both are pulled to the fully applied position, vehicle can skid and crash, personnel can be killed or injured. Do not operate vehicle, notify organizational maintenance.	

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly S — Semi-Annual

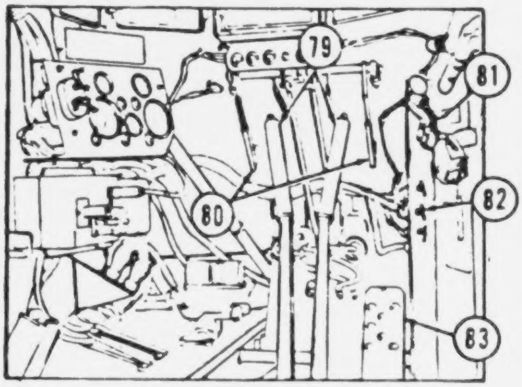
ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M	S		
41		•					STEERING, BRAKING, SHIFTING, AND THROTTLE CONTROLS **CAUTION** Vehicle must be brought to a complete stop before shifting into reverse range. Damage to the transmission may result. • Check these controls and be alert for binding, grabbing, looseness or malfunctions. • Operate the differential steering levers (79), pivot steering levers (80), shift lever (81) in all ranges, hand throttle (82) and accelerator pedal (83). — Get to know your carrier's response to these controls. — If the response does not feel right or if the response changes, report it to organizational maintenance.  best copy available	If there is a noticed difference between left and right steering laterals in excess of one notch on the quadrants when both levers are in the fully applied position. Steering lateral travel is less than the second notch or more than the fourth notch on the quadrants in the fully applied position. Binding, grabbing, unusual noise or vibration is felt during operation of items 79,80,81 and/or 82.

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly S — Semi-Annual

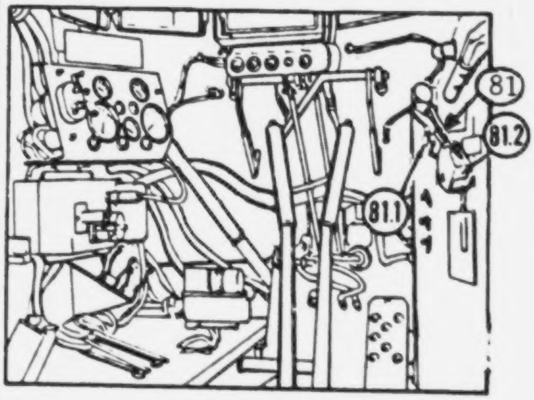
ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M	S		
41		•					STEERING, BRAKING, SHIFTING, AND THROTTLE CONTROLS (cont.) • Check for proper operation of the neutral start switch (81.1). Engine should only start with range selector (81) in "N" position. • Check transmission range selector mounting screws (81.2). If they are loose or missing, report it to organizational maintenance. 	If switch (81.1) is missing or if engine can be started in any forward or reverse range. If mounting screws (81.2) are loose or missing.

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						CAUTION **Vehicle must be brought to a complete stop before shifting into reverse range. Damage to the transmission may result.**	
						Check these controls and be alert for binding, grabbing, looseness, or malfunction. • Operate the differential steering levers (79), pivot steering levers (80), shift lever (81), hand throttle (82), and accelerator pedal (83). • Get to know your vehicle's response to these controls. • If the response changes, report it to organizational maintenance.	Differential steering levers (79) do not stop when braking. Any binding, grabbing, unusual noise, or vibration are felt or heard during operation of items (79), (80), (81), and (83).

TA 159030

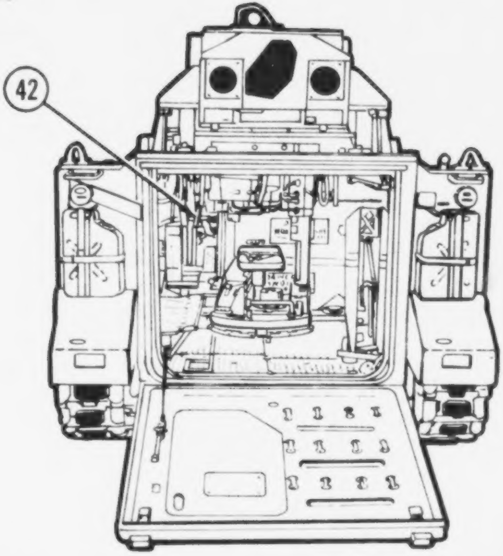
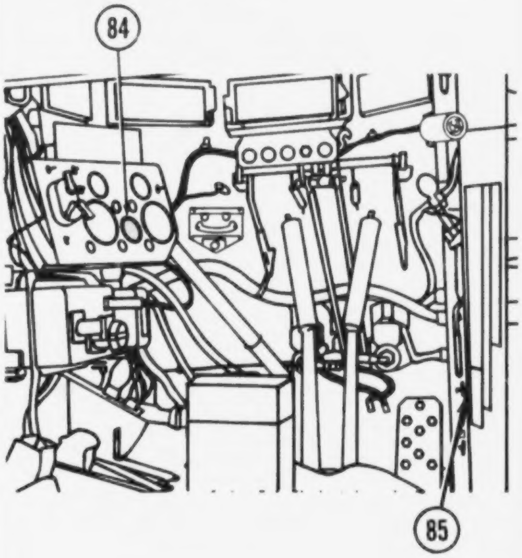


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
42		●				ENGINE SHUTDOWN 	

TA 159031

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						Check engine for proper shutdown. • Reduce idle speed to normal idle (650 to 700 rpm). Allow engine to idle 3 to 5 minutes until normal idle operating temperature (180°F to 185°F) is reached as indicated by temperature gage (84). Pull fuel cut-off (85) to stop engine. Inspect fuel cut-off cable for any binding, grabbing, or looseness that may prevent the engine from being shut down. Lock vehicle differential brakes and notify organizational maintenance if engine will not shut down. **NOTE** **A – After operation PMCS steps 43 through 52 begin the moment the vehicle engine shuts off.**	Engine won't shut down.

TA 159032

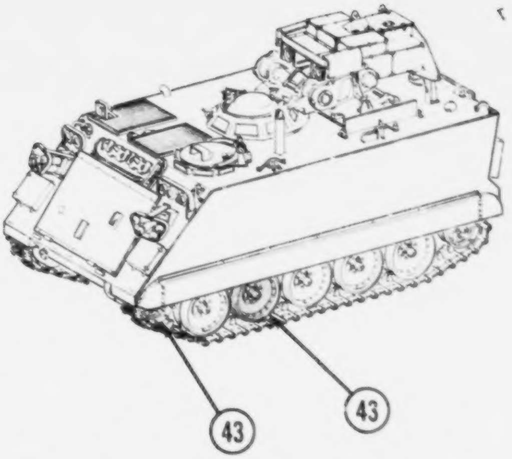
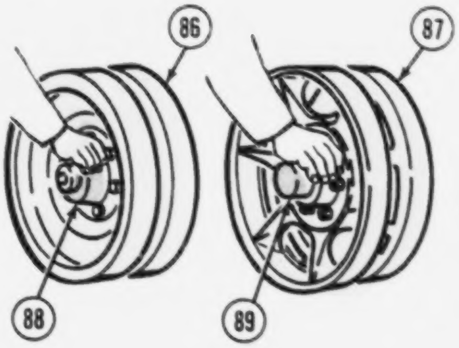


Table 2-1. Preventive Maintenance Checks and Services — Continued

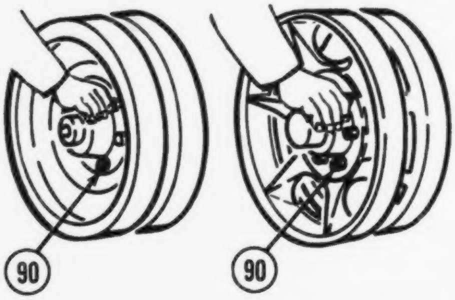
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
43			●			ROADWHEELS AND IDLER WHEELS  **WARNING** **Roadwheel hubs and idler wheel hubs can heat up enough to burn you.**	

TA 159033

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						Check for missing, bent, or cracked roadwheels (86) and idler wheels (87). Check roadwheels and idler wheels for excessive heat, worn mounting holes, and separation of rubber from metal. • Feel roadwheel hubs (88) and idler wheel hubs (89). **NOTE** **If any hub feels hotter than any other, or is hotter than normal, you may have a bearing that needs service.** 	Missing, bent, or cracked roadwheel or idler wheel. Mounting holes enlongated.
						• Report any hub that feels hotter than others to organizational maintenance. • Inspect roadwheels and idler wheels for worn mounting holes (90) by looking for a shiny area around the mounting nuts. • Inspect roadwheels and idler wheels for base separation of rubber and metal.	Separation of one-half of rubber contact from the steel hub. Chunking across one-half the width of the other rubber surface.

TA 159034

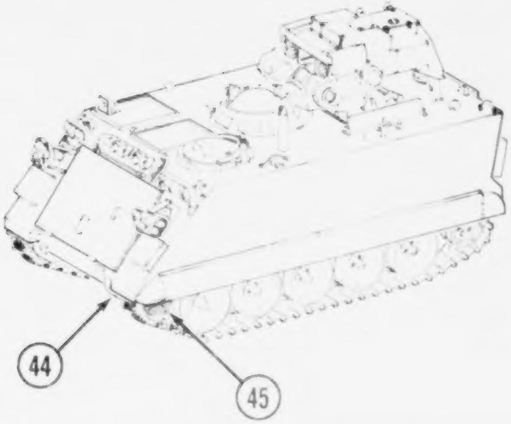
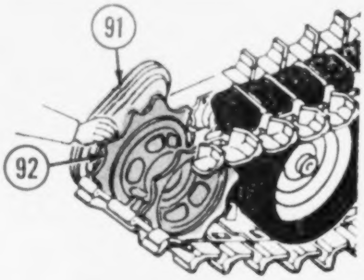


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
44			●			FINAL DRIVE BEARINGS	
							
						WARNING **Final drive housings can heat up enough to burn you.**	
						Check final drive housings for overheating.	Any overheated final drive housing.
						• Feel final drive housing (91) for excessive heat.	
						• Report any excessively hot final drive housing to organizational maintenance.	

TA 159035

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
45			●			SPROCKETS	
						• Check sprockets (92) for broken or missing teeth.	Sprocket teeth cracked or missing.
						• Hand check sprocket bolts for looseness.	
						• Report loose bolts to organizational maintenance.	Three or more bolts missing.

TA 159036

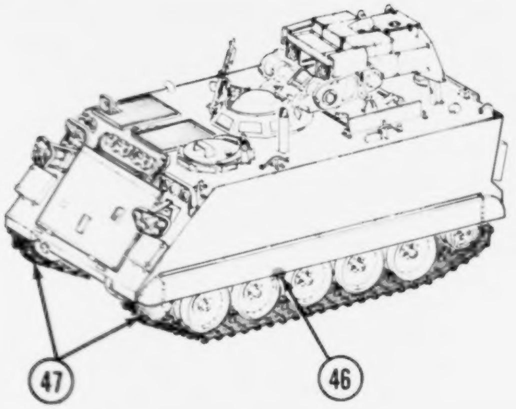
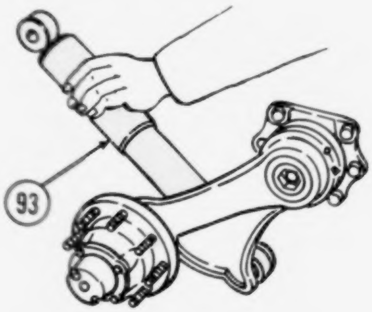


Table 2-1. Preventive Maintenance Checks and Services — Continued

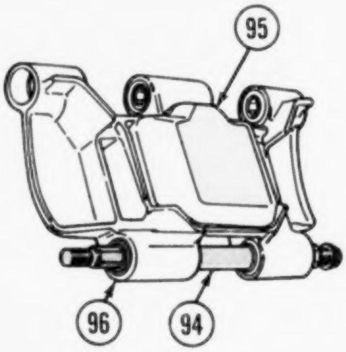
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
46			●			SHOCK ABSORBERS  **WARNING** **Shock absorbers can heat up enough to burn you.** Check shock absorbers. After a good run, shock absorbers should be hot enough so you can tell they have been working.	

TA 159037

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						• Feel each shock absorber (93). A cold one is no good. • Report a cold shock absorber to organizational maintenance.	
47			●			TRACK SHOES AND PINS  Inspect track for obvious damage. • Look for cracked or broken pins (94), worn track shoe pads (95) and worn bushings (96). NOTE **A worn bushing (96) will cause a track shoe to appear off-center from the rest of the track.** • Report cracked and/or broken pins (94) to organizational maintenance. • Measure any track shoe pad (95) and/or bushing (96) suspected of excessive wear. (See page 3-42 for measuring track wear.)	Three or more damaged track shoes on one side of vehicle.

TA 159038

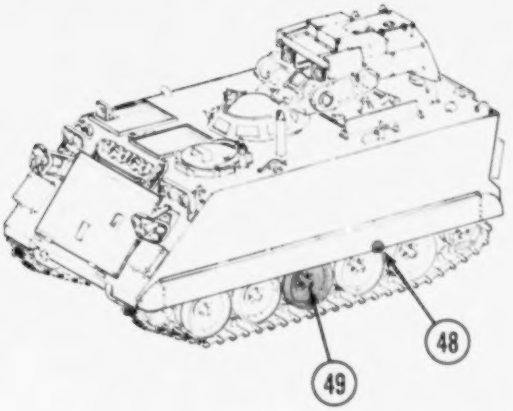
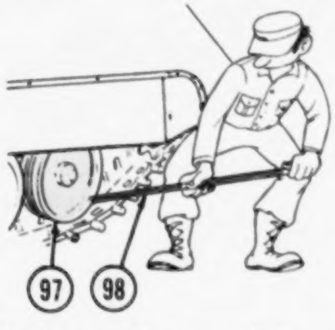


Table 2-1. Preventive Maintenance Checks and Services — Continued

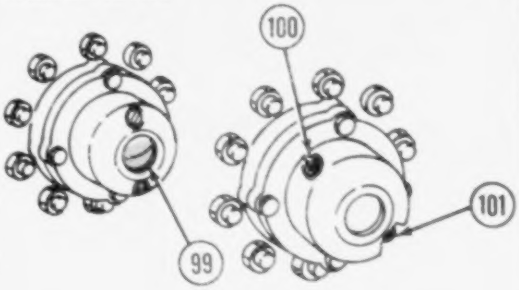
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
48			●			ROADWHEEL ARMS AND TORSION BARS 	
						Check for bent, broken, or missing roadwheel arms and torsion bars. • Try to lift each roadwheel (97) with a crowbar (98). • If any roadwheel comes up easily, you have a broken or missing torsion bar. • Report any broken or missing torsion bar to organizational maintenance.	Any broken, bent, or missing roadwheel arm or torsion bar.

TA 159039

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
49			●			WHEEL HUBS  Check to see if your vehicle has oil-filled hubs or grease-filled hubs. • The oil-filled hub will have a sight glass (99) with no grease fitting. • Check to see oil is at least half-way up in the sight glass (99). • Make sure glass is not cracked or broken. **NOTE** **If you see bubbles in the oil, or if oil looks milky, there is water in it. Report this to organizational maintenance.** • The grease-filled hub will have a grease fitting (100). • Check this type of wheel hub by adding grease to fitting (100) until it comes out of the pressure relief valve (101). Service grease-filled hubs in accordance with LO 9-2350-259-12.	Cracked or broken sight glass allowing a Class 3 leak. Any grease fitting or relief valve missing.

TA 159040

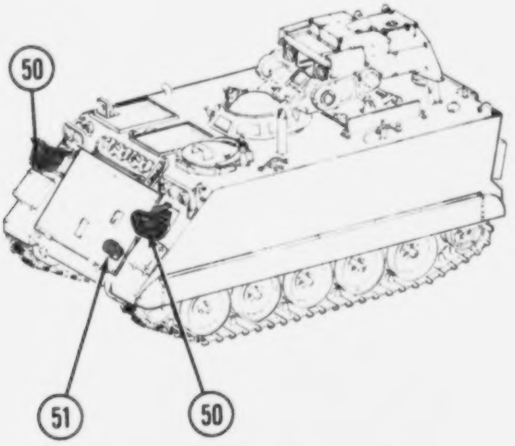
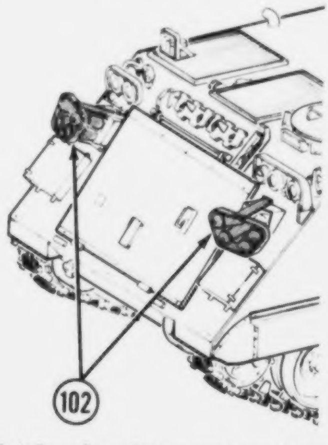


Table 2-1. Preventive Maintenance Checks and Services — Continued

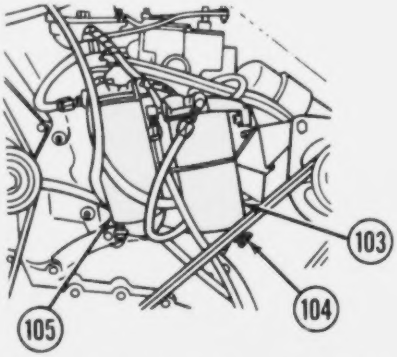
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
50			●			SMOKE GRENADE LAUNCHER*  Immediately after firing and on 2 consecutive days thereafter, thoroughly clean dischargers (102) with cleaning compound, item 5, Appendix D, ensuring that all surfaces are well coated. Do not wipe dry. *Service only if smoke grenade launchers have been used.	

TA 159041

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						• On third day after firing, clean dischargers with cleaning compound, item 5, Appendix D, and wipe dry with cloth, item 6, Appendix D. • During continued firing, clean dischargers with cleaning compound, item 5, Appendix D, but do not wipe dry or lubricate.	
51			●			FUEL FILTERS  Drain any water and/or deposits out of the primary and secondary fuel filters. To drain fuel filters: • Place a suitable container under the drain valve of the primary fuel filter (103). Slowly turn petcock (104) to open the valve. • Allow all water/contaminants to drain into the container. Drain until clear fuel runs out. • Repeat the above steps on the secondary fuel filter (105).	

TA 159042

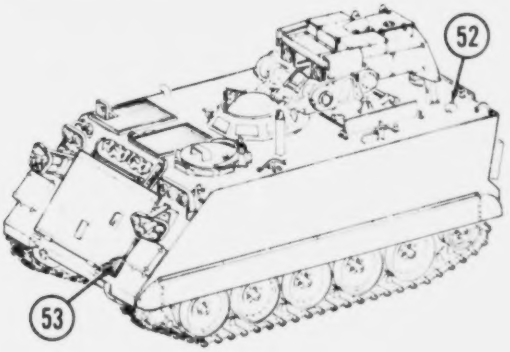
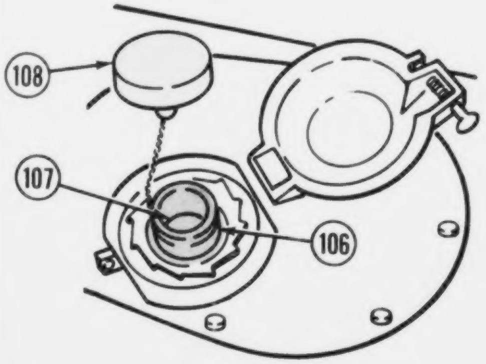


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
52			●			FUEL TANK AND FILLER CAP  Fill the fuel tank after operation. Allow about 3 inches of space in the filler neck (106) for fuel expansion. • Make sure the filler screen (107) is clean and in good shape. • If the screen needs dumping out, do it before you fill up on fuel. • See that the filler cap (108) is OK and seals properly on the filler neck.	

TA 159043

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						NOTE **Do your daily PMCS steps before your weekly PMCS. Do PMCS steps 53 through 68 each week or before operation if you are operating the vehicle for the first time.**	
53				●		AIR CLEANER ELEMENT **WARNING** **To avoid injury to personnel, contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel (chemical environment).** **CAUTION** **Do not drop or rap filter element when cleaning it.** **Two non-interchangeable air cleaner elements and containers are used in M113A2 family carriers. If your element must be replaced, make sure only a look-alike element is used. Damage to the engine could result.**	

TA 159044

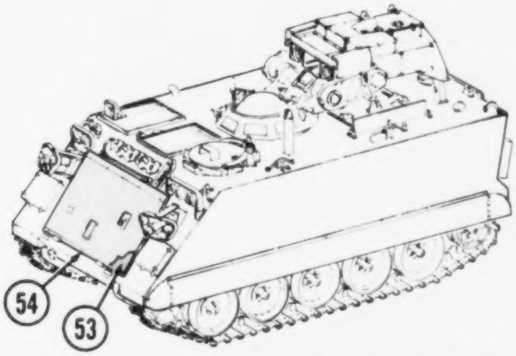
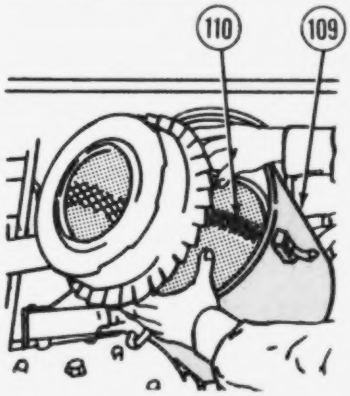


Table 2-1. Preventive Maintenance Checks and Services — Continued

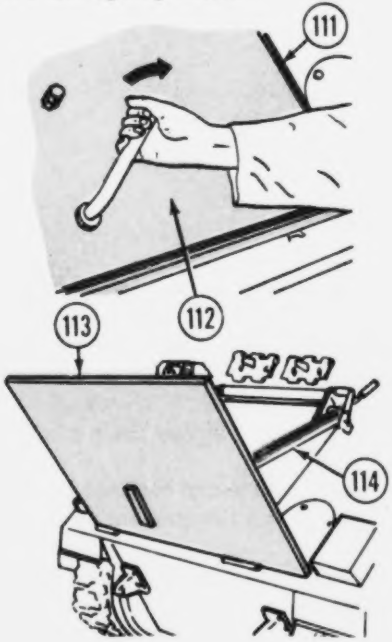
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						AIR CLEANER ELEMENT (CONT)  Service the air cleaner element weekly, or when the engine seems to lose power. Also, service the element whenever the air cleaner restriction indicator stays in the red zone after resetting. (See PMCS step 29.) • Remove the air cleaner container (109) with the element inside. • Take out the element (110), clean, and reinstall as shown on page 3-51. • Install container with element inside.	

5904

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
54				●		FRONT ENGINE ACCESS DOOR AND TRIM VANE Check that front engine access door, door seal, and trim vane are serviceable. • Inspect rubber seal (111) for breaks, brittleness, cracks, and improper seating. • Check the front engine access door (112) for water-tight fit. Make certain door locks. • Check trim vane (113) for cracks, warpage, and separation of plywood. • Operate trim vane handle (114) to make sure adjustment is correct in both the stowed and open position. 	Rubber seal damaged, worn, or improperly seated. Access door will not close, seal, and lock. Trim vane is missing or not operational.

TA 159046

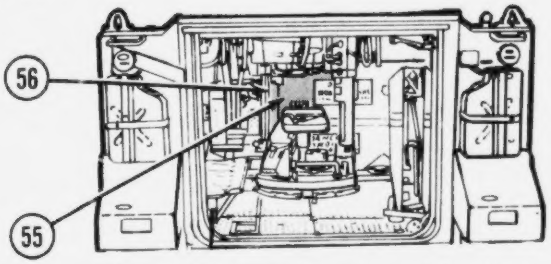
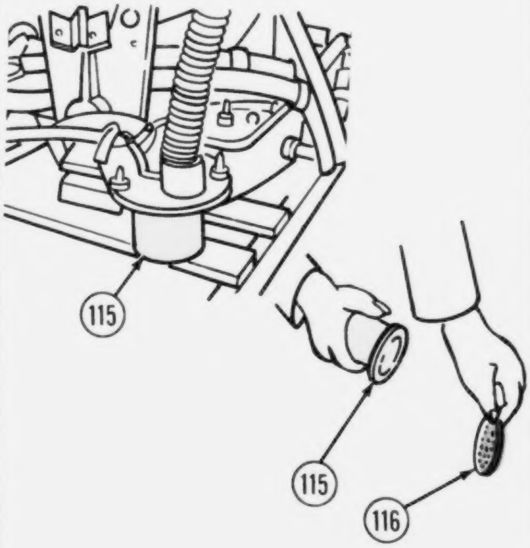


Table 2-1. Preventive Maintenance Checks and Services — Continued

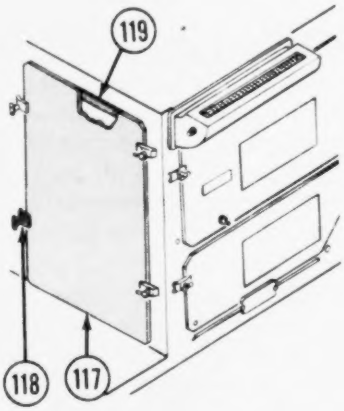
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
55				●		ENGINE AIRBOX DRAIN  Check the airbox drain can and plastic element. • Remove the airbox drain can (115). • Dump waste and element (116) out of the can. Clean the element as needed. • Put the element in the can and install on engine.	

TA 159047

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
56				●		OPERATOR'S ENGINE ACCESS PANEL AND SEAL  Inspect operator's engine access panel for proper sealing. • Inspect panel (117) for damage or warpage. • Inspect for loose or missing panel latches (118). • Tighten loose latches. • Report missing latches to organizational maintenance. • Inspect rubber sealing (119) for breaks, brittleness, cracks, or improper seating.	Panel will not seal.

TA 159048

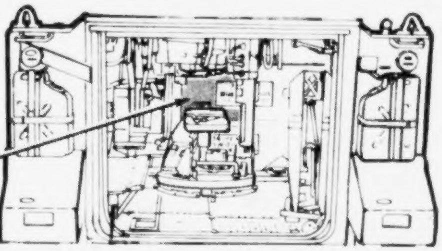
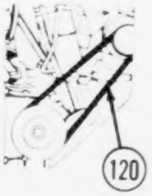
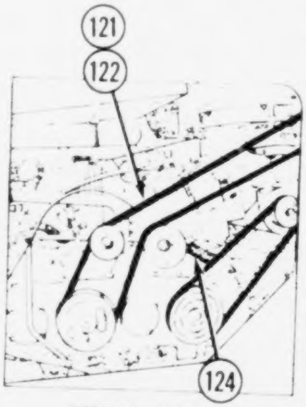
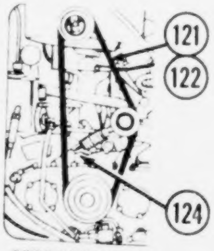
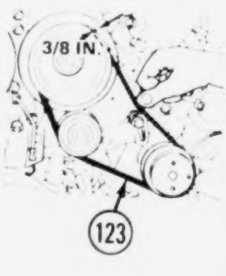


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
57				●		V-BELTS   M901/M113A2 M901A1/M113A2  M901/M113A1 M901A1/M113A1  	

TA 159163

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						Check V-belts for looseness and cracks. Check idler adjustment. • Inspect generator belt (120), rear fan belt (121), front fan belt (122), and coolant pump belts (123). • Inspect idler adjuster (124) for correct adjustment. Report any idler adjustment rod not between the operating range marks to organizational maintenance. • Inspect coolant pump belt (123) tension by pushing on belt halfway between pulleys. If belt moves more than 3/8 inch, report it to organizational maintenance. • Inspect pulleys for any indication of cracks. Report any damage to belts or pulleys to organizational maintenance.	

TA 159050

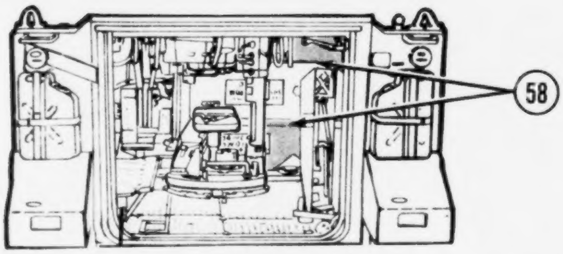
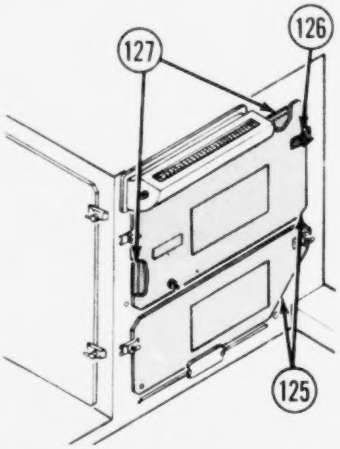


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
58						REAR ENGINE ACCESS PANELS AND SEAL  Inspect rear engine access panels (125) for proper sealing. • Inspect panels (125) for damage or warpage. • Inspect for loose or missing panel latches (126). • Tighten loose latches. Report missing latches to organizational maintenance. • Inspect rubber sealings (127) for breaks, brittleness, cracks, or improper seating.	Panel will not seal.

TA 159051

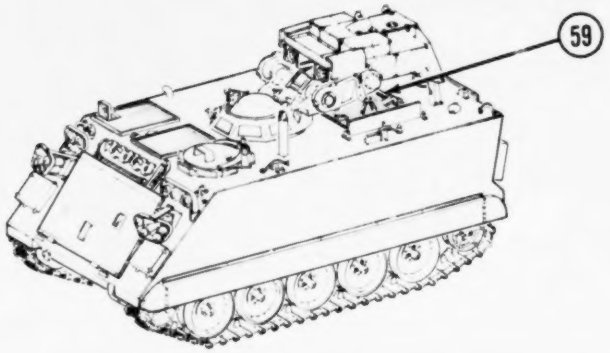


Table 2-1. Preventive Maintenance Checks and Services — Continued

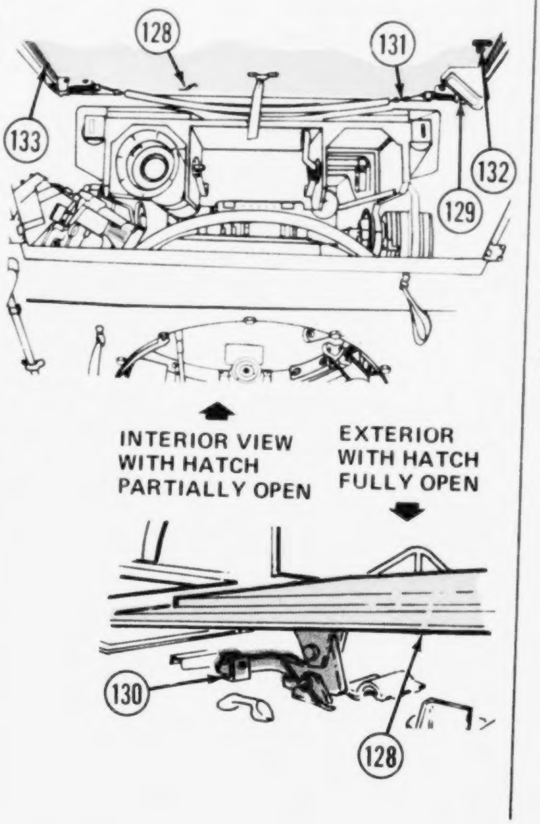
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
59				●		CARGO HATCH **NOTE** **Prior to checking the cargo hatch, erect the launcher (page 2-186.5). Upon checking the cargo hatch, stow launcher (2-186.17).**	

TA 159052 ■

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						CARGO HATCH (CONT) Check operation and security of the cargo hatch (128). Make sure hatch opens and closes smoothly and can be secured in the closed and the 3 open positions. Check operation of locking pin (129), exterior latch (130), interior latch (131), and detent catch (132). Inspect hatch seals (133) for breaks, brittleness, cracks, and proper sealing. Report any damage to organizational maintenance.  128 131 133 132 129 INTERIOR VIEW WITH HATCH PARTIALLY OPEN EXTERIOR WITH HATCH FULLY OPEN 130 128	Interior latch does not hold the hatch in the closed position. Exterior latch does not hold the hatch in the full-open position. Detent catch does not hold the hatch in the two partially open positions. Hatch does not seal.

TA 159053

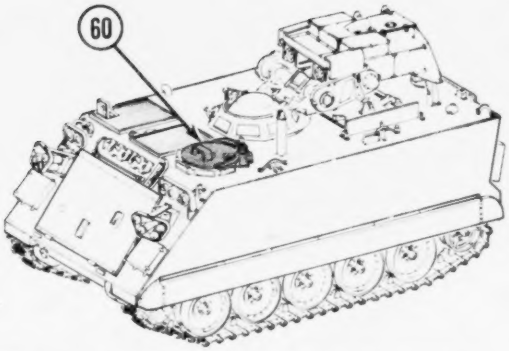
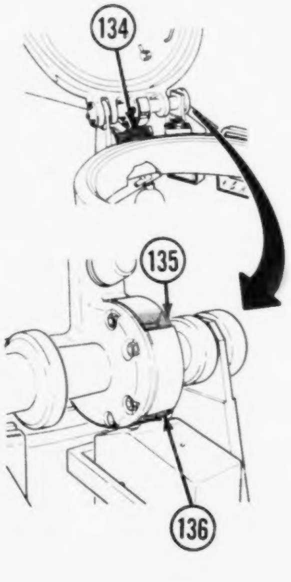


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
60				●		DRIVER'S HATCH Inspect the yoke support assembly and insert block detents. 	Yoke support assembly does not hold driver's hatch in open position.

TA 159054

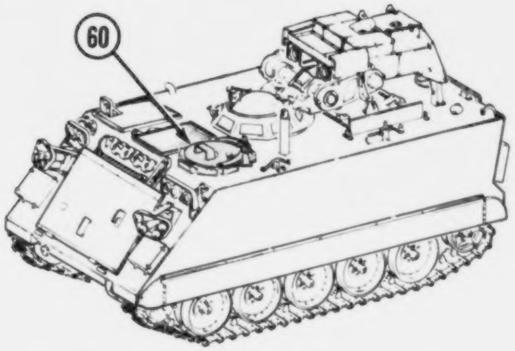
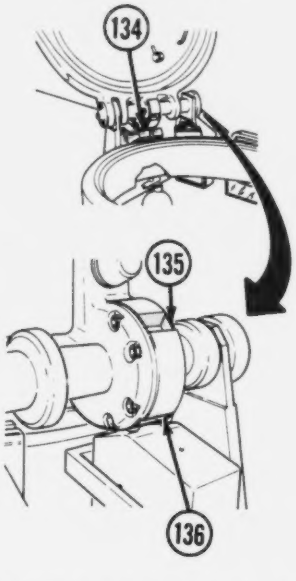


Table 2-1. Preventive Maintenance Checks and Services — Continued

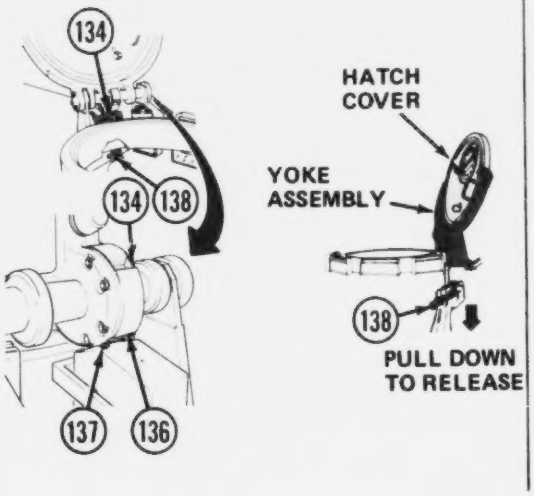
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						DRIVER'S HATCH (CONT)  • While driver's hatch is closed and latched, inspect yoke support assembly (134) and insert block detents (135) and (136) for mud, dirt, and any debris that could interfere with smooth operation of the assembly.	

TA 159055

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						• If cleaning is required, clean in accordance with page 3-40.1. **WARNING** **The yoke support assembly could fail to operate if the hatch release handle (138) gets caught on the ledge directly behind it. Watch for this any time the hatch release handle is operated.** Check operation of yoke support assembly. • Raise the driver's hatch to the first detent (135) (pop-up) and the second detent (136) (full-up) positions. Make sure stop (137) fully engages insert block detents (135) and (136) in each position. Check operation of hatch release handle (138) for smooth operation.  134 HATCH COVER YOKE ASSEMBLY 134 138 138 PULL DOWN TO RELEASE 137 136	

TA 159056

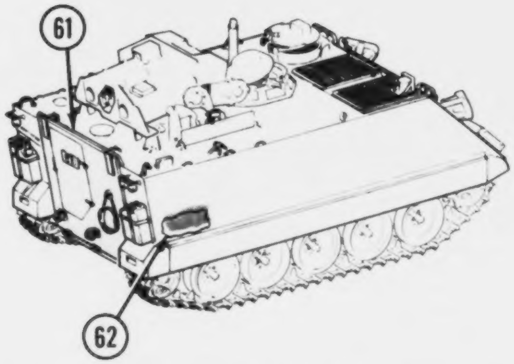
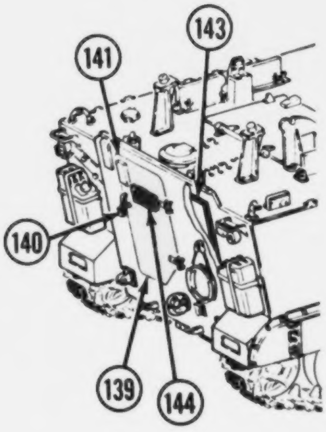


Table 2-1. Preventive Maintenance Checks and Services — Continued

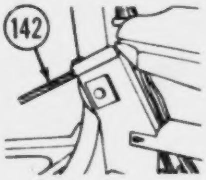
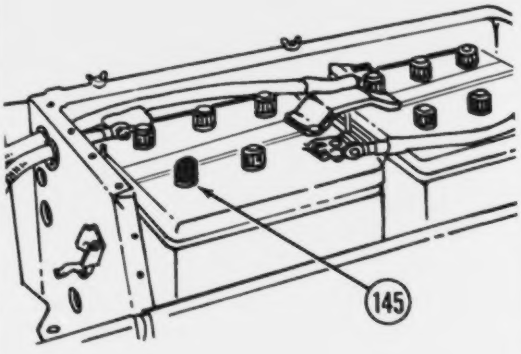
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
61				●		REAR RAMP AND REAR RAMP DOOR Check rear ramp and door for proper operation and seal. • Check rear door (139) operation. Make sure hinges work properly and that door can be tightly secured by lock (140). • Check rear door seal (141) for breaks, brittleness, cracks, or improper seating. 	Rear ramp and/or ramp door will not seal. Rear ramp will not raise or lower under power. Ramp lock will not hold ramp in closed position. Ramp wire rope is frayed or broken. Vision block is cracked or missing.

TA 159057

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						• Check rear ramp wire rope (142) for frayed or broken strands. • Inspect ramp-to-hull seals (143) for breaks, brittleness, cracks, or improper seating. • Make sure the vision block (144) in the ramp door (139) is not cracked or missing. 	
62				●		BATTERIES Check condition of batteries and electrolyte level. • Remove caps (145) and make sure electrolyte is at the right level. Notify organizational maintenance if level is low. 	Batteries unserviceable. Obvious visual damage to battery, battery casing, terminals, posts, and/or retainers.

TA 159058

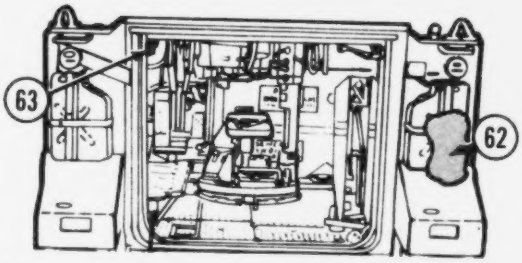
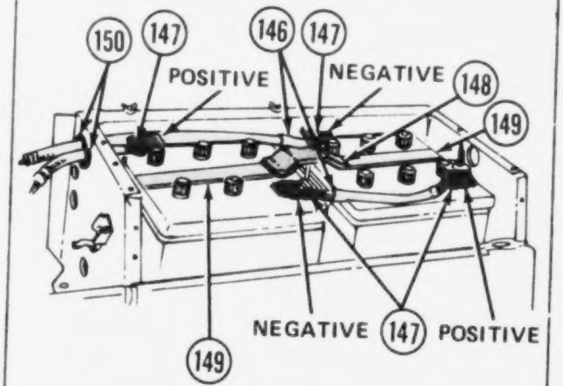


Table 2-1. Preventive Maintenance Checks and Services — Continued

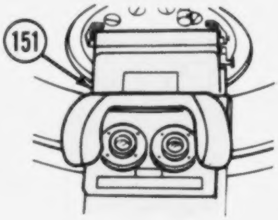
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						BATTERIES (CONT)  150 147 POSITIVE 146 147 NEGATIVE 148 149 NEGATIVE 147 POSITIVE 149 • Check that vent holes in caps are clear before reinstalling caps. • Inspect battery casings for obvious damage. • Make sure cables (146) and terminals (147) are clean. • See that the hold-down clamps (148) and retainers (149) are tight. • Check for presence of rubber grommets (150) on battery compartments. Notify organizational maintenance of missing grommets.	

TA 159059

Table 2-1. Preventive Maintenance Checks and Services — Continued

B— Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						• See TM 9-6140-200-14 for (W)-Weekly battery preventive maintenance. **CAUTION** **In cold weather, organizational maintenance must charge the batteries immediately after adding water so that water will combine with electrolyte and not freeze.**	
63				●		PERISCOPE (M19)  Inspect M19 periscope (151) for damage and operation. • Visually inspect periscope (151). Report any obvious damage to organizational maintenance.	View through scope is totally obstructed.

TA 159060

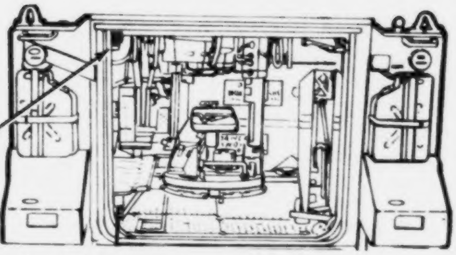
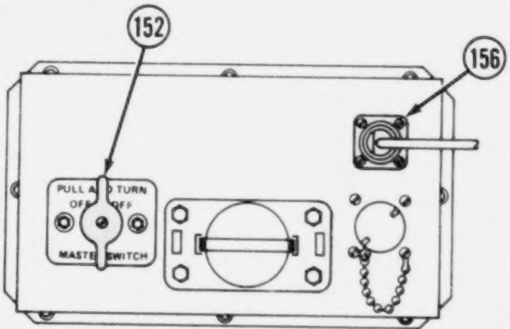
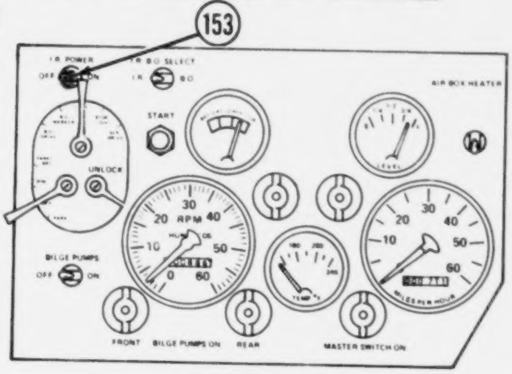
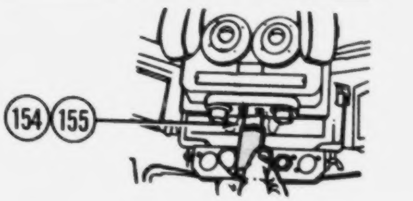


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						PERISCOPE (M19) (CONT)  152 156 PULL AND TURN OFF OFF MASTER SWITCH  153 I.R. POWER OFF ON I.R. B.O. SELECT I.R. B.O. START AIR BOX HEATER UNLOCK RPM BILGE PUMPS OFF ON FRONT BILGE PUMPS ON REAR MASTER SWITCH ON MILES PER HOUR  	

TA 159061

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						WARNING **The infrared (IR) power pack is a high voltage item. Injury to the operator can result if the master switch (152) and IR switch (153) are turned on before power cable (154) is connected. DO NOT install cable (154) if master switch (152) and IR switch (153) are ON.** • Make sure master switch (152) and IR switch (153) are in OFF positions. • Inspect power cable electrical connectors (155) for bent or missing pins. Report damaged connectors (155) to organizational maintenance. • Attach power cable (154) to M19 periscope (151) and IR periscope receptacle (156). • Turn master switch (152) and IR switch (153) to ON positions. • Test periscope for operation by using it to look around darkened vehicle. **WARNING** **After inspecting, DO NOT disconnect power cable (154) until IR switch (153) and master switch (152) are turned OFF and one minute has passed to allow residual voltage to drain.**	

TA 159062

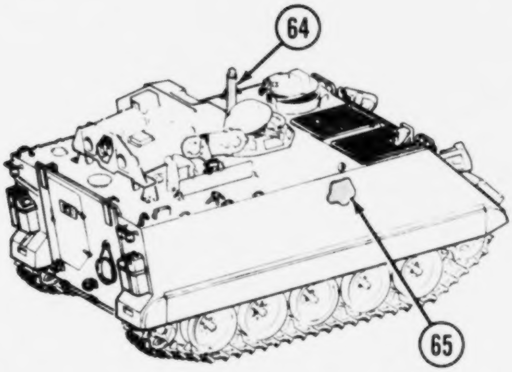
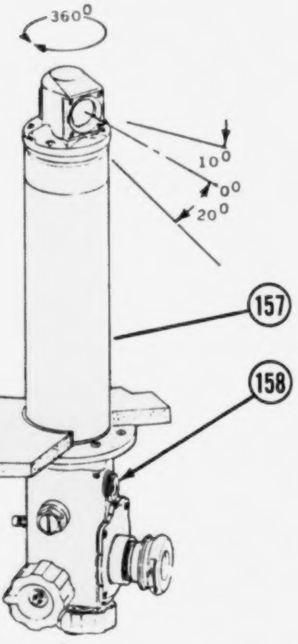


Table 2-1. Preventive Maintenance Checks and Services — Continued

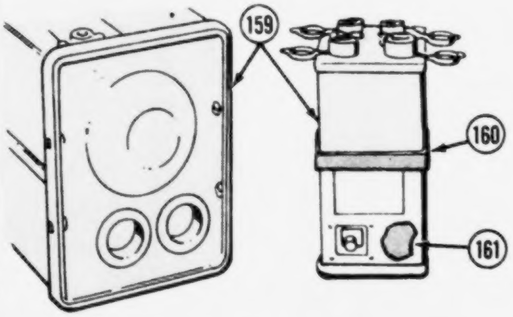
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
64				●		SQUAD LEADER'S PERISCOPE  	

TA 159063

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						Check squad leader's periscope (157) for cleanliness and secure mounting. Ensure that periscope traverses throughout 360°, elevates approximately 10°, and depresses approximately 20°. Visually ensure that humidity indicator (158) is not pink. If humidity indicator is pink, notify organizational maintenance.	Squad leader's periscope does not traverse, elevate, or depress within prescribed limits. Humidity indicator is pink.
65				●		GAS PARTICULATE UNITS  **WARNING** **To avoid injury to personnel, contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel (chemical environment).** • Check the air purifier housing (159) for obvious damage and presence of spring clip (160). • Operate air purifier blower (161) to make sure it is OK.	Blower does not work. Air flow at any station is restricted.

TA 159064

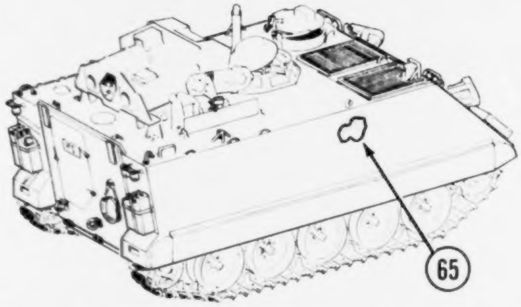
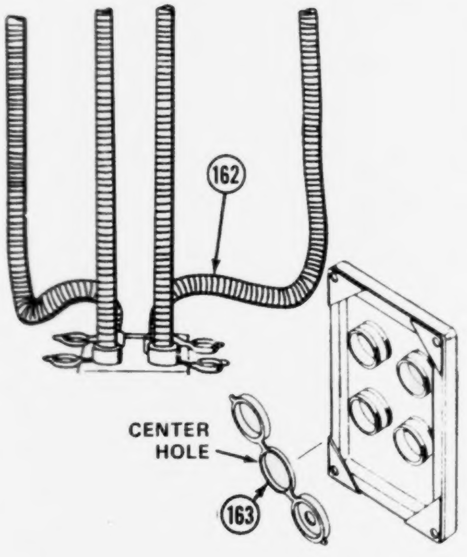


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						GAS PARTICULATE UNITS (CONT)  • Inspect hoses (162) for wear, cracks, and holes. • After blower is operating, place your hand over the air flow control cap (163). A noticeable flow of air should be present at the center hole.	

TA 159065

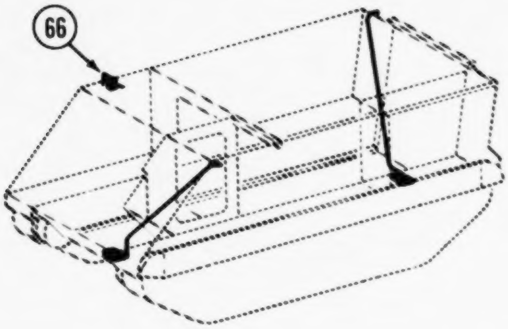
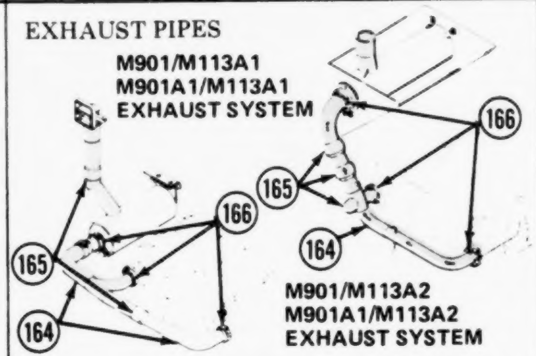


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
66				●		EXHAUST PIPES  M901/M113A1 M901A1/M113A1 EXHAUST SYSTEM 166 165 166 165 164 164 M901/M113A2 M901A1/M113A2 EXHAUST SYSTEM **NOTE** **Inspect with engine running at normal idle.** Check exhaust pipes for leaks and damage. • Inspect for presence of exhaust escaping through pipes (164) and pipe connections (165). • Use a tool to test security of exhaust pipe clamps (166). Shut off engine and allow system to cool before tightening loose clamps.	Exhaust system leaks or any part is missing, improperly aligned, or insecurely mounted.

TA 159164

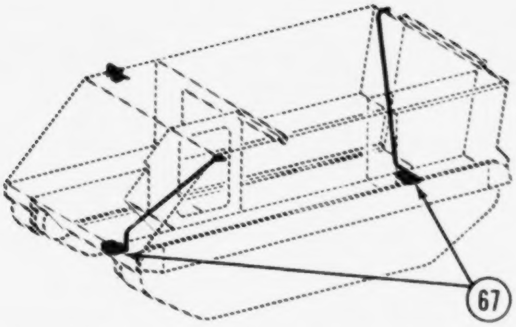


Table 2-1. Preventive Maintenance Checks and Services — Continued

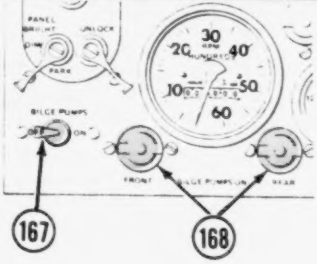
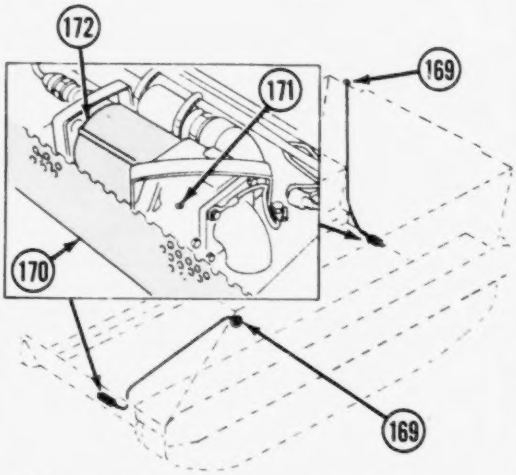
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						EXHAUST PIPES (CONT) • Notify organizational maintenance if a loose clamp is detected but is too difficult to service because of its location.	
67				●		BILGE PUMPS Check bilge pumps weekly and before amphibious operations. • Turn on bilge pump switch (167). Make sure front and rear bilge pump lights (168) are on.	Class 3 fuel leak evident. Pumps do not work.

TA 159067

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						 PANEL BRIGHT DIM UNLOCK PARK BILGE PUMPS OFF ON 30 20 40 10 50 60 RPM HUNDREDS FRONT BILGE PUMPS ON REAR 167 168  172 171 169 170 169 • Direct crew member to feel at bilge pump outlets (169) for a stream of air or to look for a stream of water if water is in the vehicle. • Check bilge pump intake screens (170) and vent holes (171) for clogging. • Clear screen of all trapped trash. • Clear pump vent holes (171) by running a wire in and out a few times. • Check pumps (172) and areas around each pump for evidence of fuel leaks.	

TA 159068

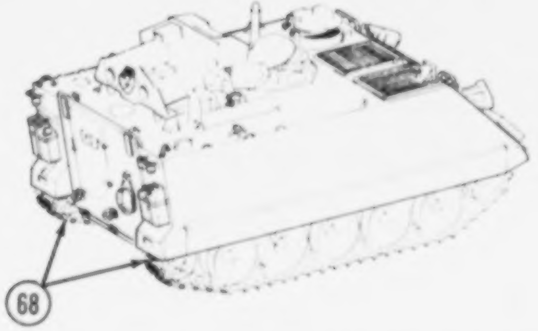
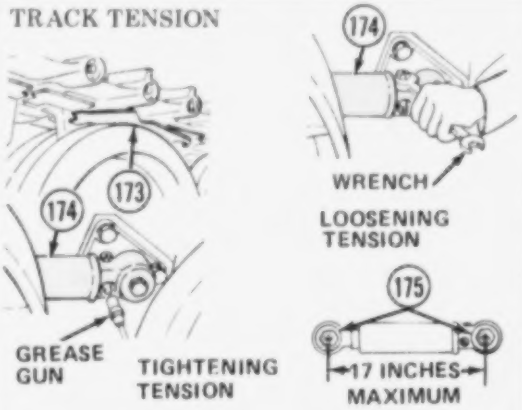


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
68				●		TRACK TENSION  174 173 174 GREASE GUN TIGHTENING TENSION WRENCH LOOSENING TENSION 175 17 INCHES MAXIMUM **WARNING** **To avoid injury to personnel, area in front of vehicle must be clear and level before coasting to a free stop.** Check track tension and adjust as necessary. To do so, drive your vehicle onto hard, level ground. Let vehicle coast to a stop. Do not use the brakes. After vehicle has stopped, shut off engine, exit vehicle, and remove track shrouds. (See page 3-48.) Measure track tension as follows:	Any track adjuster missing or unserviceable.

TA 159069

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before   D — During   A — After   W — Weekly   M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						• Position track tension gage (173) lightly against the track at the center line of the second roadwheel. • Look through the hole in the gage (173). • If the surface of the roadwheel can be seen through the hole and the track is resting on the third roadwheel, track tension is OK. **CAUTION** **Do not extend the track adjuster (174) beyond 17 inches as measured between the center of each track adjuster mounting screw (175). A track adjuster extended beyond 17 inches will become damaged during vehicle operation.** • If tension is off, adjust as necessary. (See page 3-44.) • Repeat the above inspection procedure on the opposite track. Adjust track tension as needed. NOTE **Do your daily and weekly PMCS steps before doing your monthly steps. PMCS checks 69 through 73 are monthly.**	

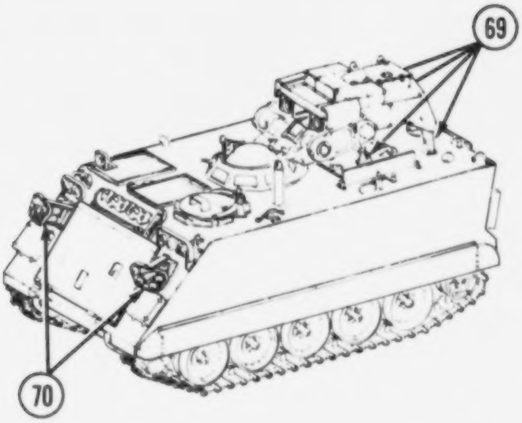
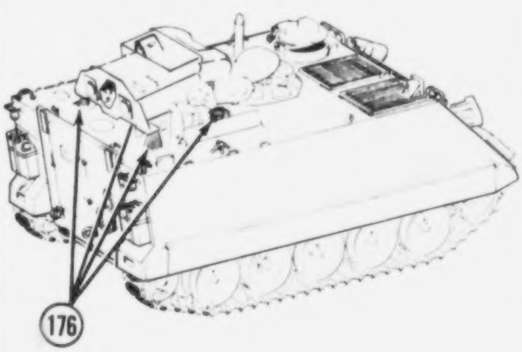


Table 2-1. Preventive Maintenance Checks and Services — Continued

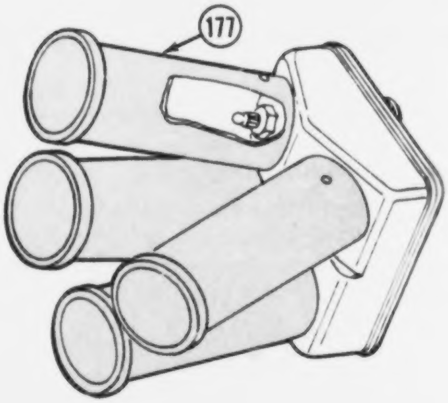
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
69					●	**ERECTOR-LAUNCHER STOW BRACKETS**  Check that stow brackets (176) are securely mounted to vehicle. • Inspect for loose, missing parts, cracks, or damage and ensure that rubber bumpers are intact.	One or more stow brackets are loose, broken, or missing.

TA 159071 B

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval B	D	A	W	M	ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
70					●	SMOKE GRENADE DISCHARGERS  Make sure there is no dirt or debris in tubes (177). • Make sure firing contacts are not corroded or damaged. • Make sure drain holes in the bottom of the tubes are open.	

TA 159072

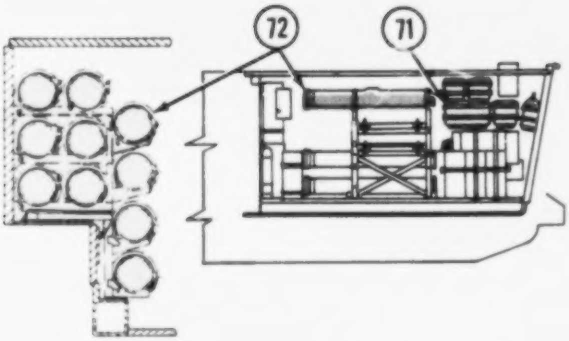
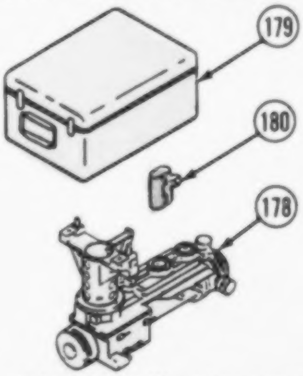


Table 2-1. Preventive Maintenance Checks and Services — Continued

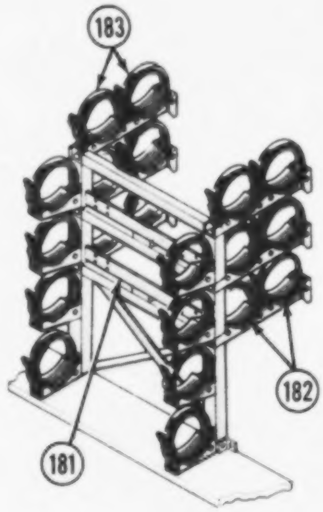
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
71					●	NIGHTSIGHT COLLIMATOR 	
						Inspect nightsight collimator case (179) to ensure that the collimator (178) and battery (180) (M901 only) are present.	Collimator is missing. Battery is not charged (M901 only).
						• Check for cracks or scratches in lenses or mirror and serviceability of knobs.	Lenses are cracked or broken.
						• Check that verification label is present and support maintenance has performed verification within the last 180 days.	Verification is out of date.

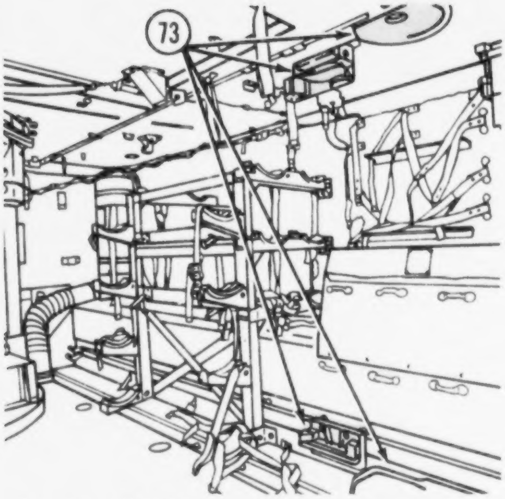
TA 159165

Table 2-1. Preventive Maintenance Checks and Services — Continued

B → Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
72					●	MISSILE RACKS  Inspect missile racks (181) for loose or missing parts or damage. • Inspect rubber pads (182) for cracks or deterioration. • Inspect tiedown straps (183) for tears or frayed areas. • Ensure that missile racks are mounted securely to vehicle, all hardware is in place, and tight, and all catches work properly.	Vehicle cannot carry and store securely at least 9 missiles.

TA 159074



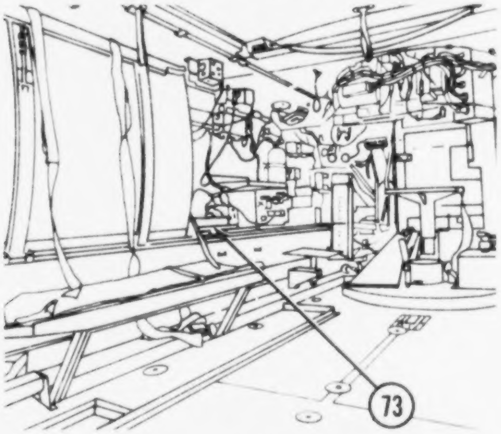


Table 2-1. Preventive Maintenance Checks and Services — Continued

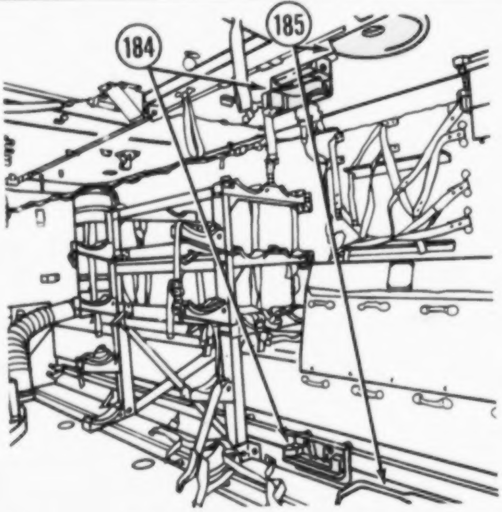
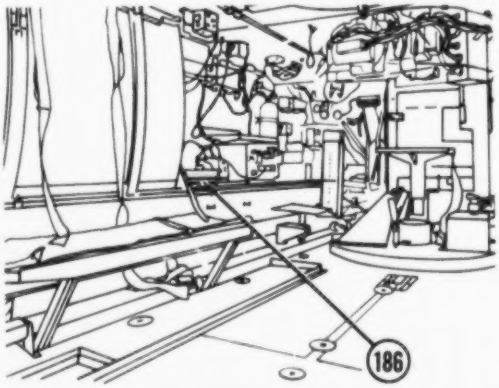
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
73					●	TOW COMPONENTS STOWAGE BRACKETS	

TA 159075

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						  Ensure that launch tube stowage brackets (184), tripod stowage brackets (185), and traversing unit stowage bracket and coupling clamp (186) are securely mounted to the vehicle and have no loose or missing hardware. • Inspect for torn or frayed straps and pads or other obvious damage.	Any one of the ground TOW components cannot be stowed.

TA 159076

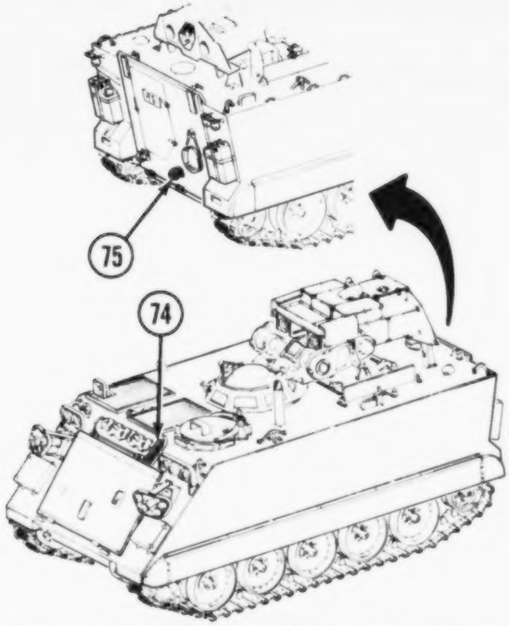


Table 2-1. Preventive Maintenance Checks and Services — Continued

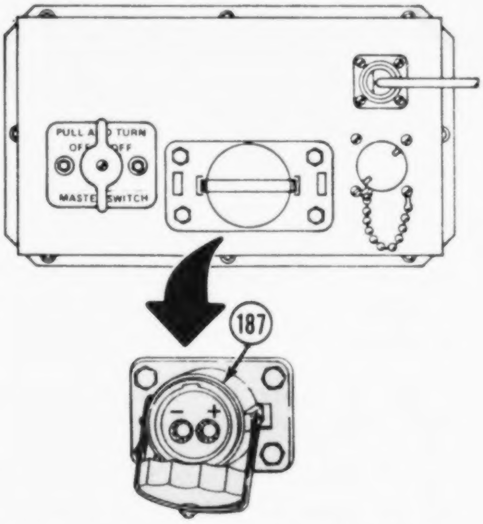
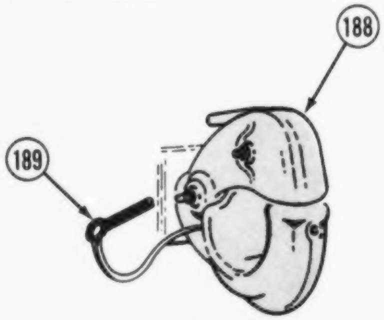
B - Before D — During A — After W — Weekly M — Monthly Q — Quarterly

ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M	Q		
							NOTE **PMCS checks 74 through 78 are to be done by operator and vehicle crew before turning vehicle into organizational maintenance for quarterly service.**	

TA 1590

Table 2-1. Preventive Maintenance Checks and Services — Continued

B - Before D — During A — After W — Weekly M — Monthly Q — Quarterly

ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M	Q		
74						●	SLAVE CABLE  Check the slave cable receptacle and cap (187) for damage and corrosion.	
75						●	TOWING PINTLE  Inspect pintle hook (188) and locking pin (189) for operation. Turn pintle around twice to make sure it does not bind. Check that pintle locks securely in the closed position.	

TA 159078

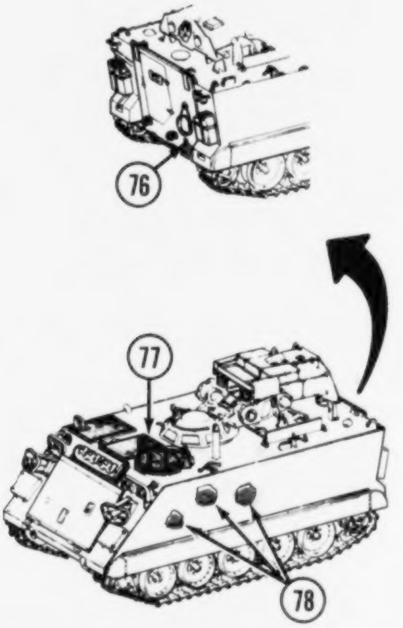
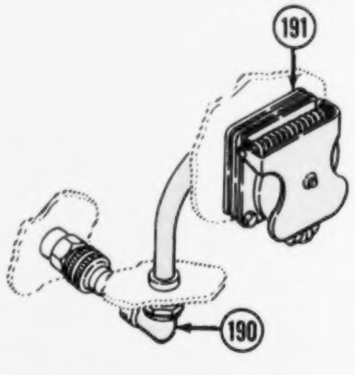


Table 2-1. Preventive Maintenance Checks and Services — Continued

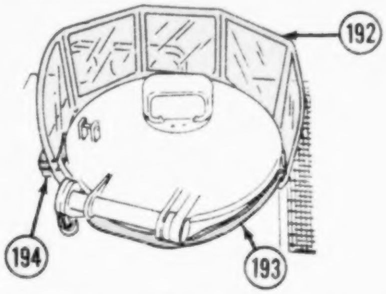
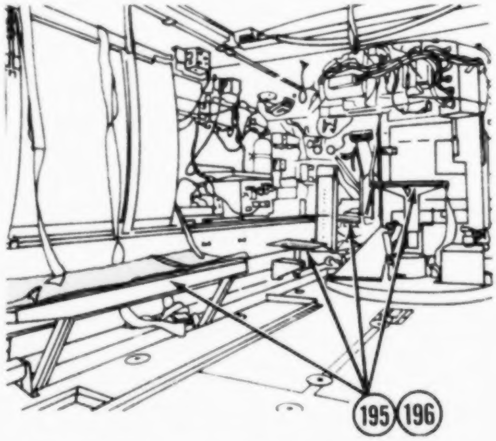
B - Before D — During A — After W — Weekly M — Monthly Q — Quarterly

ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M	Q		
76						●	TRAILER LIGHT RECEPTACLE  Check trailer light receptacle cable (190) for damage. Inspect receptacle (191) for obvious damage and/or corrosion.	

TA 159079

Table 2-1. Preventive Maintenance Checks and Services — Continued

B - Before D — During A — After W — Weekly M — Monthly Q — Quarterly

ITEM	Interval						ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M	Q		
77						●	WINDSHIELD KIT (IF EQUIPPED)  • Inspect windshield (192) for damage. Inspect for worn canvas and strapping (193). • Inspect shield for broken or bent clips (194).	
78						●	SEATS  • Check cushions and backrests (195) for rips, tears, holes, and open seams. • Make certain seat belts (196) are present and seats are mounted securely to the hull.	

TA 159080

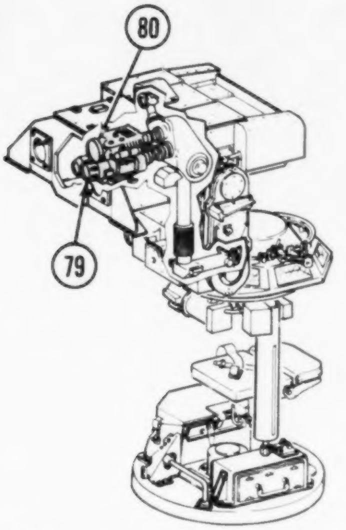


Table 2-1. Preventive Maintenance Checks and Services — Continued

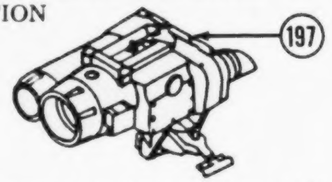
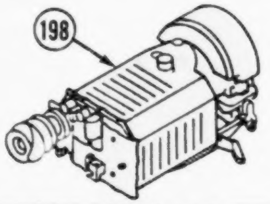
B —Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						GUNNER'S STATION AND TURRET **NOTE** **Perform steps 79 through 88 Weekly as well as Before if:** **• You are the assigned operator but have not operated the equipment since your last Weekly inspection.** **• You are operating the equipment for the first time.**	

TA 159081

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
79	●					DAYSIGHT/TRACKER VISUAL INSPECTION  Visually inspect daysight/tracker (197) for dirt, missing parts, and damaged pins or connectors. • Ensure that daysight/tracker can be securely mounted. (See page 2-135.)	Daysight/tracker cannot be securely mounted.
80	●					NIGHTSIGHT VISUAL INSPECTION **NOTE** **Nightsight shown is for M901 application. (See page 2-53 for nightsight used on M901A1.)**  **CAUTION** **On the M901, a coolant cartridge (full or empty) must be installed on the nightsight at all times except when exchanging cartridges. This prevents contaminants from entering the cooling system and damaging the nightsight.** Visually inspect the nightsight (198) for dirt, damage, or missing parts. • Ensure that nightsight can be securely mounted.	Nightsight cannot be securely mounted.

TA 159166

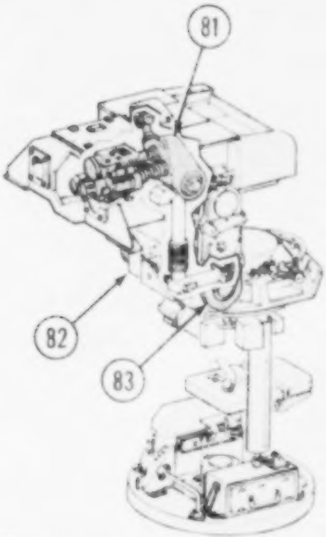
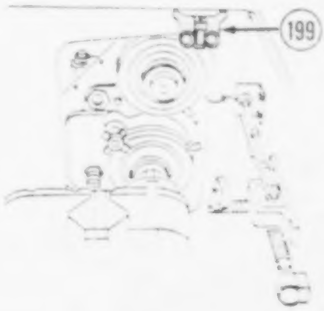


Table 2-1. Preventive Maintenance Checks and Services — Continued

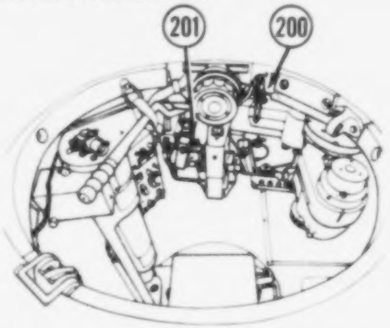
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
81	●					NIGHTSIGHT BRT AND CTRS ACTUATOR ASSEMBLY  Make sure the nightsight BRT and CTRS actuator assembly (199) mounts securely to actuator holding bracket.	Actuator assembly cannot be mounted properly.

TA 159083 ■

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
82	●					GUNNER'S STATION  • Check the reservoir dipstick (200) for hydraulic fluid. Any amount is OK.	Fluid is discolored or milky.
						NOTE **Any amount of fluid on dipstick is acceptable because this will ensure that there is enough fluid in the system to erect the launcher. The launcher must be erect before the system can be checked for the proper level of hydraulic fluid.**	
						• Check the hydraulic fluid at the sight gage window (201) for discoloration.	Class 3 leaks are present.
83	●					GUNNER'S STATION/HYDRAULIC FITTINGS AND LINES Check gunner's station for hydraulic leaks. • Look for obvious signs of leaking. (Drops on the fittings or floor.) • Run your fingers along the fittings and feel for leaks.	
84	●					LAMP TEST Perform a lamp test with checkout procedures on pages 2-186.4 and 2-186.5.	Any part of test fails.

TA 159084

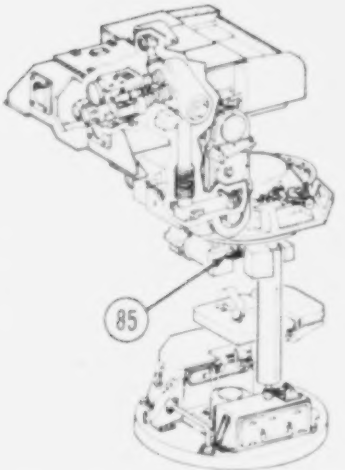
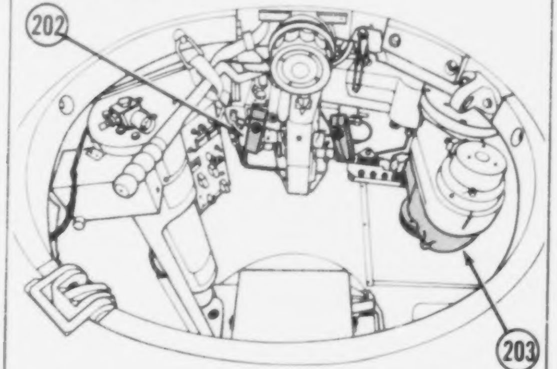


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
85	●					GUNNER'S HAND CONTROL  Make sure that hand control assembly (202) and the azimuth drive (203) are securely mounted. • Inspect track and slew brakes mounted to underside of azimuth drive (203). • For loose or missing hardware, notify organizational maintenance of any problem.	

TA 159085

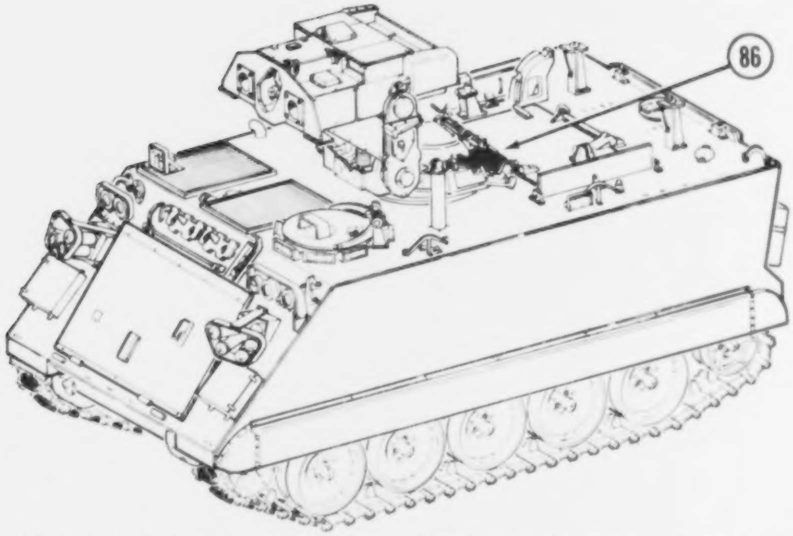


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
86	●					MACHINEGUN AND MOUNT **WARNING** **To avoid injury, make sure machinegun is clear of ammunition and barrel is free of obstructions.**	

TA 159086

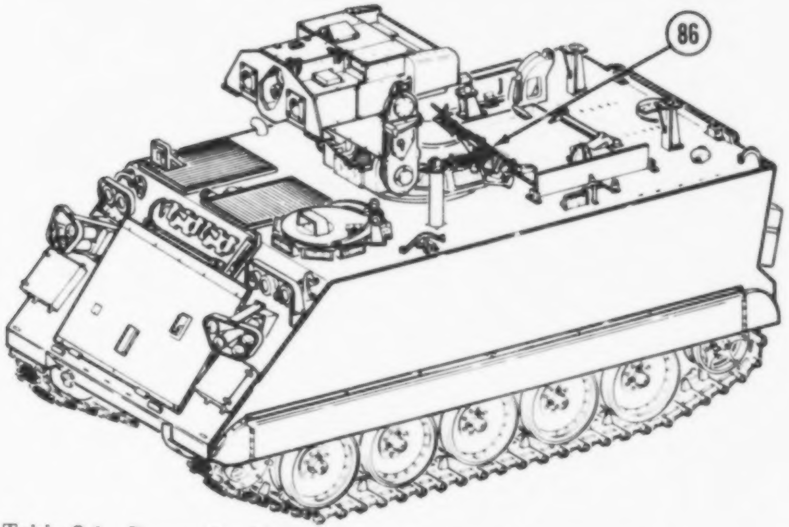
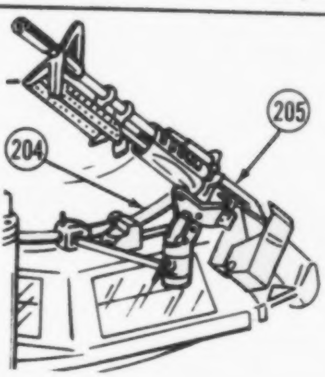


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						 Check gun mount/arm assembly (204) for missing, loose, or damaged hardware. • Check machinegun (205) to ensure it is secure on its mount and locked in the stow position. • See TM 9-1005-224-10 for BEFORE operation preventive maintenance.	

TA 159087

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
87	●					MGS SELF-TEST (M901) Perform MGS self-test for position 1 and positions 3 through 6. Refer to procedures on page 2-186.2. NOTE **Positions 2 and 7 of MGS self-test will be performed during later checks in the PMCS.** **After system power is applied, the MGS self-test (during operation) should be performed, steps 1 through 7.** **The MGS self-test, steps 1 through 7, should be performed after every 4 hours of system operation; after any 10°F (plus or minus) change in temperature; and prior to any mission.**	MGS fails any part of the self-test.
88	●					ERECTION OF LAUNCHER Perform checkout of erection of launcher in accordance with procedures on page 2-186.5.	Launcher fails any part of checkout.

TA 159167

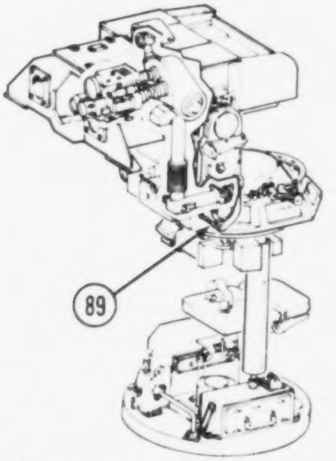
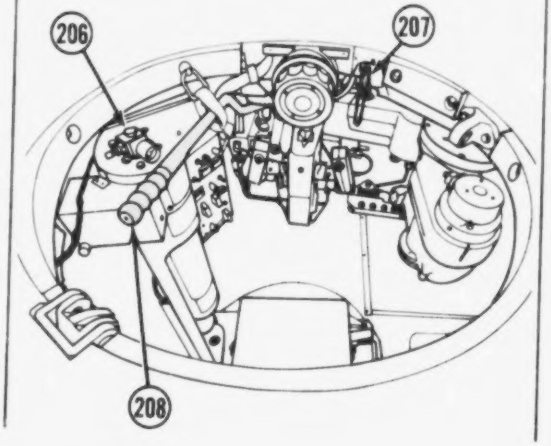


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						NOTE **D – During operation checks begin after the engine has been started. But before your vehicle is moved, perform PMCS steps 89 through 99.**	
89		●				GUNNER'S STATION DIPSTICK CHECK  	

TA 159089

Table 2-1. Preventive Maintenance Checks and Services — Continued

B— Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						Bleed down (relieve) the turret hydraulic pressure as follows:	EMER PWR light fails to come on.
						• Set the EMER PWR switch on the gunner's control panel to the up (on) position.	
						• Grasp the hand grips of the gunner's hand controls.	Launcher fails to elevate.
						• Squeeze the action switches.	
						• Rotate the hand grips rearward until the launcher reaches maximum elevation.	Launcher fails to lower.
						• Rotate the hand grips forward to depress the launcher to minimum elevation.	
						• Attempt to elevate the launcher again to ensure that hydraulic pressure has been bled (relieved). The launcher should not move.	
						• Check the accumulator gage (206) to ensure it shows between 850 to 1100 ±100 pounds per square inch (psi).	Accumulator gage does not show proper pressure level.
						• Check the reservoir dipstick (207) for proper level of hydraulic fluid.	
						• Check manual hydraulic pump (208) by pumping to make sure it increases hydraulic pressure at least 100 psi.	Manual pump fails to increase pressure properly.
						• Set EMER PWR switch to the OFF (down) position. Check to ensure that the electric hydraulic pump runs and keeps pressure between 1525 and 1900 psi.	
						• Notify organizational maintenance if fluid level is low.	

TA 159090

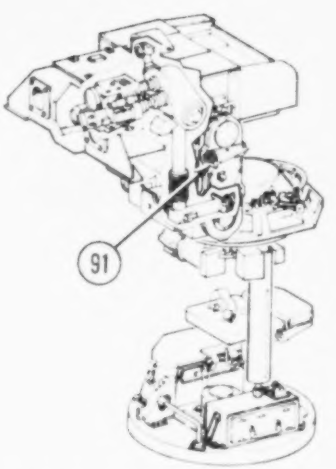
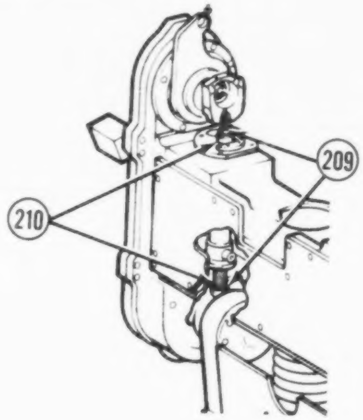


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
90		●				TRIGGERS (M901) Perform checkout of triggers in accordance with procedures on page 2-186.8.	Triggers fail any part of checkout.
91		●				ERECTION ARM/HYDRAULIC LOCK CYLINDERS 	

TA 159197

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
						With the erection arms in the "erect" position, inspect the detents (209) and shaft ends (210) of both hydraulic locking cylinders for burrs or dirt.	Cylinders fail to lock.
						• Check for leaking hydraulic line connections.	Any Class 3 leaks.
92		●				TRAVERSING/SLEWING OF TURRET (M901) Perform checkout of traversing/slewing of turret in accordance with page 2-186.6.	Turret fails any part of self-test or checkout.
93		●				TRAVERSING/SLEWING/ELEVATION/DEPRESSION OF LAUNCHER (MGS SELF-TEST 2) (M901) Perform checkout of elevation/depression of launcher in accordance with page 2-186.7.	Launcher fails any portion of self-test or checkout.
94		●				LAUNCH TUBES AND HATCH FIRE INTERRUPT CIRCUITRY Perform checkout of launch tubes and hatch fire interrupt circuitry in accordance with procedures on pages 2-186.10 through 2-186.11.	Launch tubes or hatch fire interrupt circuitry fail any part of checkout. Hatches fail to secure properly in open or closed position, or fail to seal properly.

TA 159168

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
95		●				**SELECTION AND ARMING OF MISSILES (M901)** Perform checkout of selecting and arming of missiles in accordance with procedures on page 2-186.12.	Turret fails any part of checkout.
96		●				**LAUNCHER ELEVATION AND DEPRESSION FIRE INTERRUPT CIRCUITRY** Perform checkout of launcher elevation and depression fire interrupt circuitry in accordance with procedures on page 2-186.13.	Fire interrupt circuitry fails any part of checkout.
97		●				**MGS SELF-TEST POSITION 7 — ITA ALIGNMENT AND BORESIGHTING (M901)** Perform checkout of the ITA alignment and boresighting on page 2-186.13. • Launcher should now be in the erected position.	ITA fails any part of alignment or boresighting.
97.1		●				**MGS SYSTEM CHECKOUT (M901A1)** Perform MGS system checkout in accordance with procedures on page 2-156.2.	MGS fails any part of system checkout.
98		●				**STOWING OF LAUNCHER** Stow the launcher in accordance with procedures on pages 2-186.17 and 2-186.18.	Launcher fails to stow properly.
99		●				**MACHINEGUN AND MOUNT** Service and clean machinegun in accordance with page 3-40.1.	

NOTE

Perform your daily before PMCS steps prior to doing your weekly checks. Do PMCS steps 100 through 103 each week or before operation if you are operating the equipment for the first time.

TA 159169

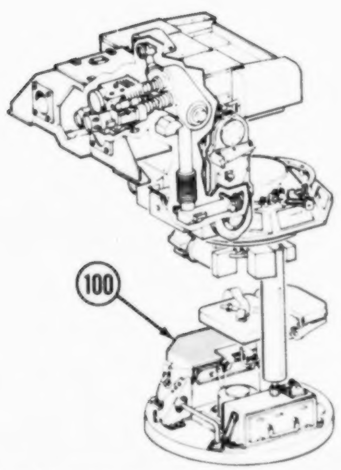
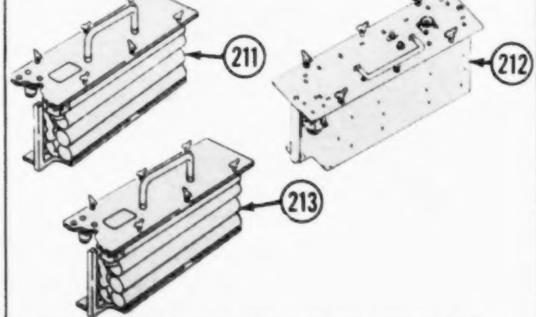


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
100				●		MGS BATTERIES AND TVPC (M901) Check the charge of the MGS batteries (211) and the TVPC (212) (MGS self-test position 1). • Check the MGS batteries (211) and TVPC (212) for obvious physical damage and any damage to the cover or the wing nut fasteners which secure the cover. • Alternate MGS batteries (211) with emergency battery (213) every week. 	Unable to obtain "in-band" reading for MGS self-test 1. 3 or more of the 6 wing nuts are missing or unserviceable.
100.1				●		**MGS BATTERIES AND TVPC (M901A1)** **On M901A1 system, perform a complete MGS system checkout in accordance with procedures on page 2-156.2.**	**BATT FAIL indicator illuminates.**

TA 159170

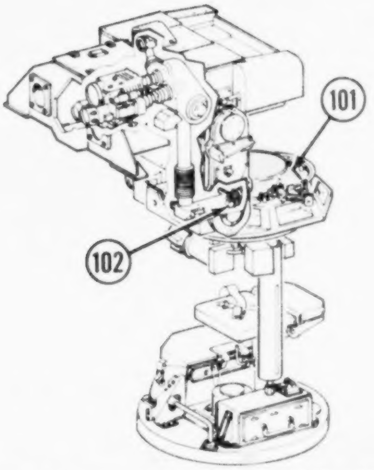
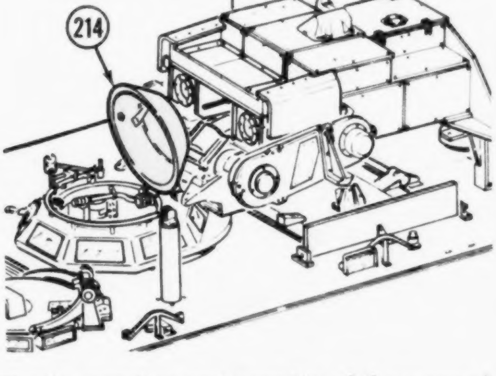


Table 2-1. Preventive Maintenance Checks and Services — Continued

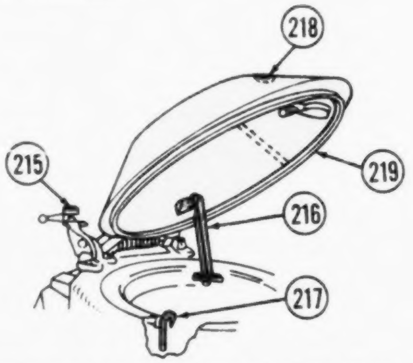
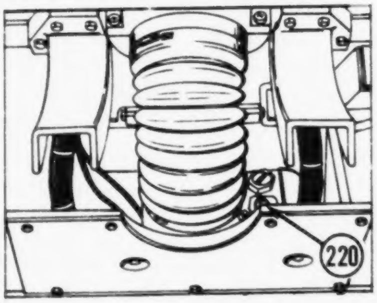
B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
101				●		GUNNER'S HATCH  Check operation and security of the gunner's hatch (214). Make sure the hatch opens and closes smoothly and can be secured in the closed, partially open, and fully open positions.	Fully open positioner does not hold hatch in fully open position.

TA 159095 ■

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
						• Check operation of fully open positioner (215), partially open positioner (216), and retainer mechanism (217) and retainer catch (218). • Inspect hatch seals (219) for breaks, brittleness, cracks, and proper sealing. • Report any damage to organizational maintenance.  	Partially open positioner does not hold hatch in partially open position. Retainer mechanism and retainer catch does not lock hatch in closed position. Hatch does not seal.
102				●		LOWER ITA HUMIDITY INDICATOR  Visually ensure that indicator (220) is not pink. **NOTE** **If the indicator is pink, notify organizational maintenance.**	

TA 159096

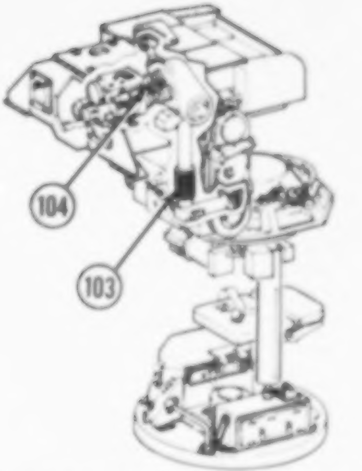
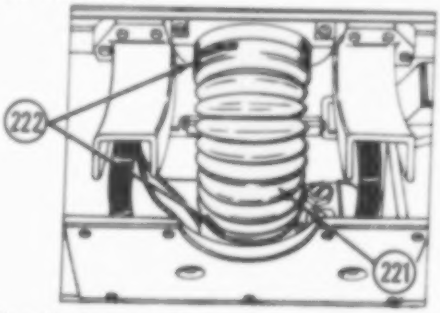


Table 2-1. Preventive Maintenance Checks and Services — Continued

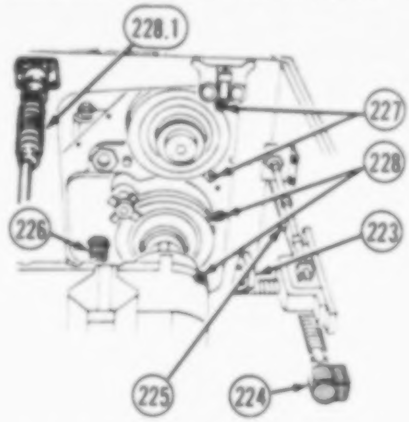
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
103				●		ITA BELLOWS  Visually inspect ITA bellows (221) for tears, holes, or cracks. • Ensure both clamps (222) are tight and in proper position. If not, notify organizational maintenance. **NOTE** **Perform your before and weekly PMCS steps prior to doing your monthly PMCS steps. PMCS routines 104 through 111 are monthly.**	Tears, holes, or cracks are found.

TA 159097

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
104					●	ITA AND NIGHTSIGHT CONTROLS  Visually check WFOV actuator (223), range focus actuator (224), and FOV cable (225) for damage. • Visually make sure ITA cable (226) is connected. • Check alignment tabs (227 and 228) to ensure they are not damaged. • On the M901A1, check post amplifier cable (228.1) to nightsight for cracked or broken insulation, bare wires, and loose or broken connectors.	Actuators, alignment tags, or cables are damaged and cannot be used.

TA 159171

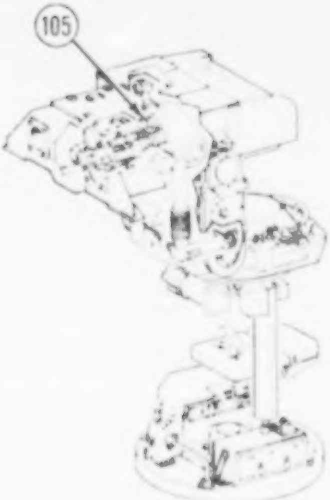
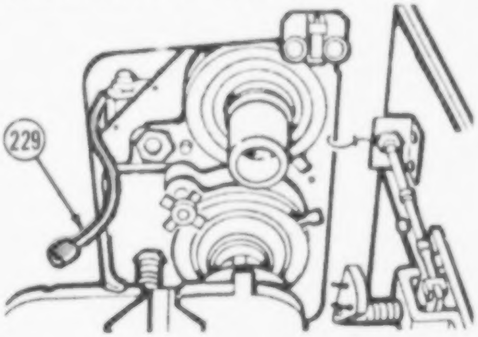


Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
105					●	NIGHTSIGHT POWER CABLE  Visually check nightsight power cable (229) for cracked or broken insulation, bare wires, and loose or broken connectors.	

TA 159099

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
106					●	TURRET ELECTRICAL WIRING Visually check turret electrical wiring for cracked or broken insulation, bare wires, and loose or broken connectors.	Electrical wiring has cracked or broken insulation, bare wires, or loose or broken connectors.
107					●	**M901/M901A1 ITV WEAPON SYSTEM** **Check for the M901/M901A1 ITV certification label which verifies that support maintenance has performed a complete system operational verification within the last 180 days.**	**More than 180 days has elapsed since support maintenance performed verification.**
108					●	GROUND TOW COMPONENTS Check for daysight/tracker, MGS, and traversing unit certification labels which verify that support maintenance has performed operational verification within the past 180 days.	More than 180 days has passed since support maintenance performed verification.

TA 159172

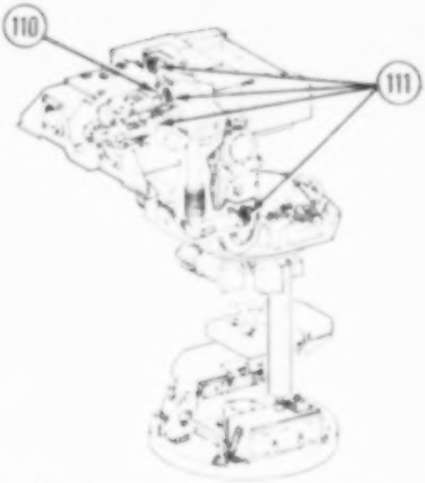
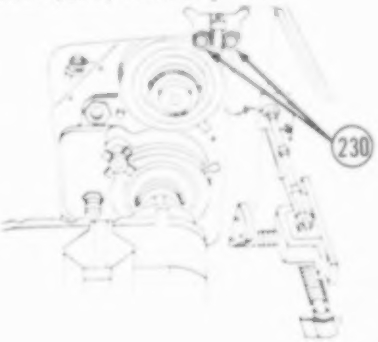


Table 2-1. Preventive Maintenance Checks and Services — Continued

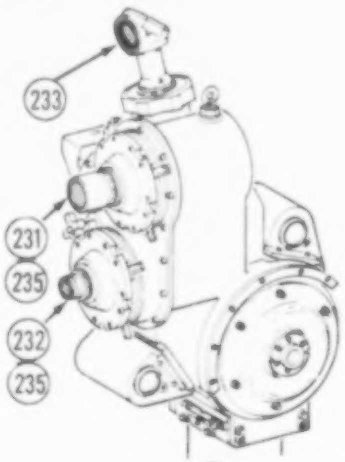
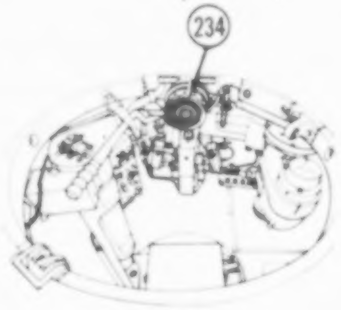
B — Before D — During A — After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W	M		
109					●	MGS SELF-TEST GROUND TOW SYSTEM On the M901 system, perform complete MGS self-test (steps 1 through 7).	Fails any portion of self-test.
109.1					●	MGS SYSTEM CHECKOUT (M901A1) On the M901A1 system, perform complete MGS system checkout in accordance with procedures on page 2-156.2	Fails any portion of test.
110					●	ACTUATOR ASSEMBLY FRICTION DRIVE HUBS Make sure that actuator assembly friction drive hubs (230) contain pads. 	One or both hubs are missing or pads are cracked or missing.

TA 159173

Table 2-1. Preventive Maintenance Checks and Services — Continued

B — Before D —During A— After W — Weekly M — Monthly

ITEM	Interval					ITEM TO BE CHECKED Check for and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/ available if
	B	D	A	W	M		
111					●	ITA LENSES   With sights removed, visually inspect the ITA top (231), and bottom (232) front lenses, the front of the ITA wide field-of-view lens (233), and the front of the ITA eyepiece (234) for dirt or moisture which could affect visibility. • If necessary, clean lenses in accordance with instructions on page 3-40. • Check to ensure that rubber adapters (235) are installed on ITA top and bottom front lenses.	There is evidence of internal moisture, a cracked or scratched lenses that impairs visibility.

TA 159102

Section III. OPERATION UNDER USUAL CONDITIONS

GENERAL

This section describes the operation of the vehicle under usual, or normal conditions. Before operating the vehicle, be sure to perform the "Before Operation Preventive Maintenance Checks and Services," table 2-1. Operation of the vehicle and subsystems of the vehicle under unusual (adverse) conditions is covered in section IV.

WARNING

Do not start engine with TURRET POWER switch ON.

ENGINE STARTUP

There are 3 separate procedures for starting this vehicle: (1) a procedure for normal, above +40 degrees F weather, (2) a procedure for cold but not extremely cold temperatures, and (3) a procedure for vehicles that operate in climates where the temperature routinely drops below −25 degrees F. The first two are given in this section and the last one is covered in the next section, Operation Under Unusual Conditions.

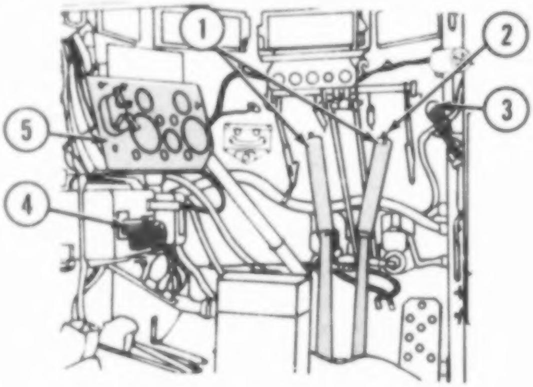
Regardless of outside temperatures, an engine that has just been shut off and is still warm can usually be started by the procedure for mild temperatures.

WARNING

Carbon monoxide gas can kill. Secure engine access panel before starting engine. Never start or run engine in enclosed areas unless adequate ventilation is provided.

STARTING IN MILD WEATHER (+40 DEGREES F AND ABOVE)

1. Perform "before operation checks and services."
2. Apply and lock brakes by pulling both steering levers (1) all the way to the rear, and pressing the lock buttons (2) on both levers.
3. Put the shift lever (3) in N (neutral).
4. Make sure all switches on the driver's control panel (5) are off and turret power is off.



5. Turn the MASTER SWITCH (4) to the ON position.

TA 070864

ENGINE STARTUP

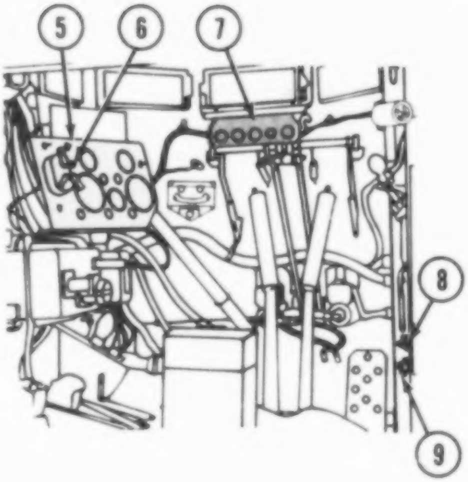
6. Check the control panel (5) and warning lights panel (7) for unusual readings. Indicators should read as follows:

   ENGINE OIL warning light — on
   BATTERY GENERATOR Indicator — Needle in green or yellow zone
   Fuel LEVEL indicator — Indicates amount of fuel in tank.

   All other lights and indicators should be off.

7. Push in the fuel cutoff control (8). (This will allow fuel to reach the engine. Pulling it out stops the fuel flow and kills the engine.)

8. Press the START switch (6).

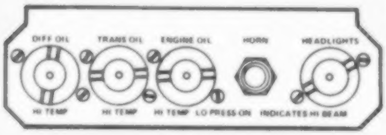


CAUTION

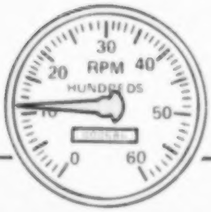
If the engine does not start within 15 seconds, wait 30 seconds before pressing the START switch again. This will prevent overheating of the starter. If the engine does not start after the fifth attempt, notify organizational maintenance personnel.

CAUTION

The ENGINE OIL HI TEMP LOW PRESS ON warning light should go out within 10 seconds after engine starts, and all other warning lights should also be off. If any warning light comes on after the engine has started, stop the engine immediately and notify organizational maintenance personnel.



TA 070865



CAUTION

Avoid operating the engine, except for short periods, at a normal idle speed of 650 - 750 rpm as this causes the engine to run below normal operating temperature, resulting in engine damage. The best idle speed is 1000 to 1,200 rpm under no-load conditions. Do not operate engine for long periods at temperatures over 230 degrees F.

9. Allow engine to warm up for 3 to 5 minutes at 800 to 1,000 rpm. Use the hand throttle control (9) to keep it there.

10. Release the hand throttle control to the idle position and recheck instrument panels. Indicators should read as follows:

    Warning lights — All off.
    BATTERY GENERATOR indicator — In green zone.
    Coolant TEMP gage — 160 to 230 degrees F.
    Tachometer — Indicates a steady 650-750 rpm idle speed.
    Fuel LEVEL indicator — Fuel in tank.

STARTING IN COLD WEATHER (+40 to −25 degrees F)

CAUTION

Although the starter does not overheat as fast at these temperatures as it would in warmer weather, excessive continuous cranking can and will result in overheating and damage to the starter even at low temperatures. DO NOT CRANK THE ENGINE LONGER THAN 45 SECONDS under this procedure, at any one attempt. Get help from organizational maintenance after the third unsuccessful attempt.

NOTE

If the engine is warm from previous operation, start the vehicle by the normal mild weather procedures; if not, proceed as follows:

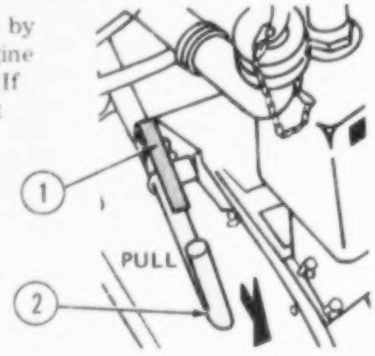
1. Perform steps one through seven of mild-weather starting procedure.

2. Remove the power plant access panel in the driver's compartment.

CAUTION

Never try to move the engine disconnect handle when the engine is running.

3. Disconnect the engine from the gear train by lifting the lock (1) and pushing in the engine disconnect handle (2) as far as it will go. If the handle is hard to move, press the start switch for a moment to turn the engine.

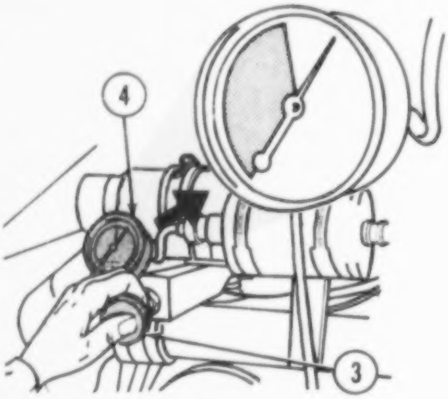


4. Close and secure the access panel.

5. If the vehicle has an airbox heater accumulator with gage and manual pump, go to step 6. and skip step 7. If the vehicle has an airbox heater with electric air pump, skip step 6. and go to step 7.

6. For vehicles that have an airbox heater accumulator with gage and manual pump, proceed as follows:

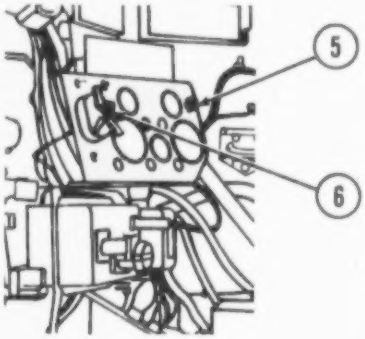
    (a) Ensure accumulator gage (4) reads in the yellow zone. Add pressure with the hand pump (3) if pressure is down. Don't raise the pressure too high. The accumulator diaphragm could pop.



    (b) Ensure fuel cutoff control (12) is pulled out.

    (c) Press in the START switch (6) and hold for about 5 seconds, then release switch.

    (d) Hold the AIRBOX HEATER switch (5) ON for a second or two, then let switch go OFF again.



TA 157879

ENGINE STARTUP

(e) Push in the fuel cutoff control (12).

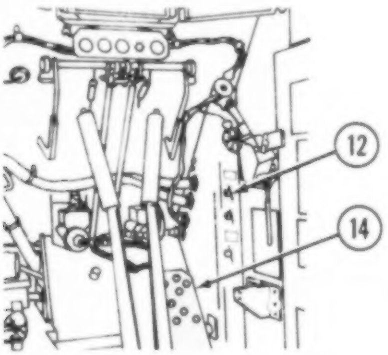
(f) Press and hold the START switch (6) while turning alternately the AIRBOX HEATER switch (5) ON and OFF (ON for about 1 second, OFF for about 2 seconds) until the engine runs at 300-350 rpm. Release the START switch but continue turning the AIRBOX HEATER switch ON and OFF until the engine runs smoothly at 650-700 rpm without switch.

7. For vehicles with an airbox heater with electric air pump, proceed as follows:

   (a) Push in the fuel cutoff control (12).

   (b) Press and hold the START switch (6) and hold the AIRBOX HEATE switch (5) ON at the same time.

   (c) If the engine doesn't start within 45 seconds of cranking, release the AIRBOX HEATER switch (5) and press the accelerator pedal (14) about halfway down. Keep on holding the START switch (6).



NOTE

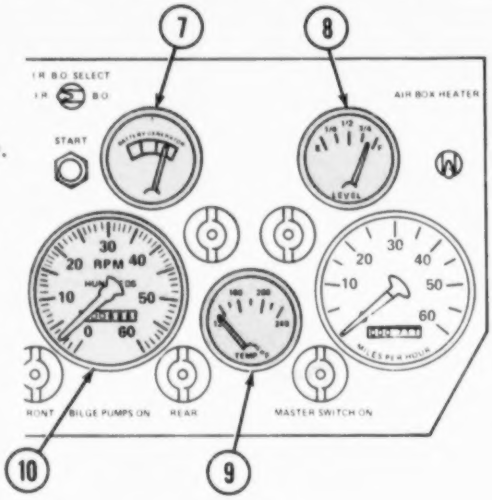
Cranking time before pressing the accelerator pedal changes with temperature. 45 seconds is for -25°F. Crank 5 seconds LESS for each 5 degrees ABOVE -25°F, down to a shortest time of 10 seconds. Crank 10 seconds at all temperatures from +10 to $+40^{\circ}$F.

   (d) If the engine doesn't start when you press the accelerator pedal (14), release the pedal and hold the AIRBOX HEATER switch (5) ON for 15-20 seconds, then OFF for 2-4 seconds. Keep on holding the START switch (6).

TA 157880

ENGINE STARTUP

8. Check the instrument panels. With the engine running, instruments should read as follows:


7
8
I R B O SELECT
I R
B O
START
AIR BOX HEATER
BATTERY GENERATOR
LEVEL
30
20 RPM 40
10
50
0 60
TEMP
20
30
40
10
50
60
MILES PER HOUR
BILGE PUMPS ON
REAR
MASTER SWITCH ON
10
9

Warning lights — All off.
BATTERY GENERATOR indicator (7) — In green zone.
Coolant TEMP gage (9) Beginning to rise.
Tachometer (10) — No excessive fluctuations. Should indicate 650-700 rpm.
Fuel LEVEL indicator (8) — Indicates fuel tank level.

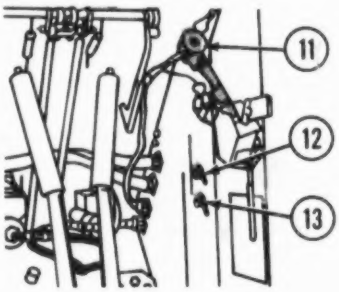
9. Run the engine for three to five minutes at a normal idle.

NOTE

Vehicles with M901/M113A1 and M901A1/M113A1 chassis have no air ventilator control beneath hand throttle control (13).

10. Set the hand throttle control (13) to idle the engine at 1,200 to 1,500 rpm for 5 minutes.

11. Push in the hand throttle control and stop the engine by pulling out the fuel cutoff control (12).



12. Re-engage the engine to the power train by pulling out the engine disconnect handle (2). If it's hard to move, press the START switch for a moment to turn the engine a little. The lock (1) will automatically engage.

13. Perform a normal mild-temperature start.

14. Place the shift lever (11) in the 2-3 range.

15. Set the hand throttle control for 800 to 1,000 rpm and run the engine for at least 10 minutes to warm up the transmission.

TA 159174

ENGINE SHUTDOWN

1. Pull back the steering and braking levers and press down the locking buttons to lock the differential brakes.
2. Place the shift lever in N position.
3. Set the engine to run at about 1,000 rpm for 2 minutes or so.
4. Set the engine back to idle (650-700 rpm) and check the instrument panel for normal readings.
5. Pull the fuel cutoff control all the way out. The engine will stop when it has burned all the fuel in its injectors and feed lines. This should only take a few seconds.

CAUTION

Always shut the engine off before turning the MASTER SWITCH to the OFF position.

6. Turn off the lights, radio, and any other electrical equipment that's on. If you have a personnel heater kit that's been running, wait for the heater to stop itself after you turn it off.
7. Turn the MASTER SWITCH to the OFF position.

DRIVING

CAUTION

Never use pivot steering levers and differential steering levers at the same time. Never touch the lock buttons on top of the hand grips when steering the vehicle.

DRIVING PRECAUTIONS

Steer in a series of short turns rather than one long even turn, especially when operating in loose sand, dirt, or rock or on sides of slopes. This will prevent rocks and debris from accumulating in the tracks which could throw a track or damage the suspension system.

Do not operate the launcher with the vehicle in motion, and avoid moving the vehicle with the launcher erected. The vehicle may be moved for short distances on level terrain with the launcher erected as long as the speed of the vehicle is kept below 5 mph.

Avoid rapid acceleration and/or deceleration.

Do not downshift from the 2-3 to the 1-3 range at speeds greater than 40 mph; from the 1-3 to the 1-2 range above 21 mph; and from the 1-2 to the 1 range above 10 mph. Never shift to reverse while the vehicle is moving forward.

TA 157882

DRIVING

Make sure that both differential steering levers are in the forward position when the pivot steering levers are being used and do not use pivot steering at speeds above 15 mph. The shift lever should be in the 1, 1-2, or R range for maneuvering with pivot steering.

Use the brakes to hold the vehicle on a slope. Do not use the engine and transmission to hold the vehicle. If the engine is running, the transmission will overheat and if the engine is off, the vehicle will move.

TA 157883

DRIVING

PLACING THE VEHICLE IN MOTION

1. Set brakes by pulling both steering levers to the rear and pressing down on the lock buttons.

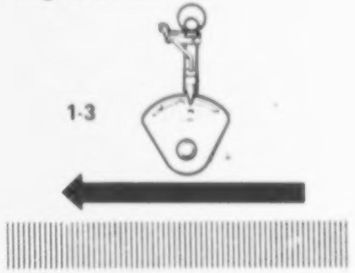
2. Start engine according to, as appropriate, either procedures on pages 2-103 and 2-105, or extreme cold weather procedures on page 2-189.

3. Make sure the ramp is in the raised position and locked.

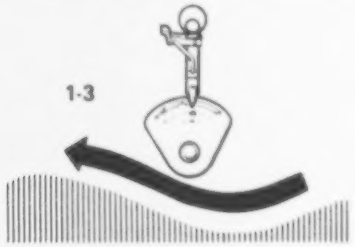
4. Push in on the hand throttle to allow the engine to idle.

5. Select the appropriate transmission range as follows:

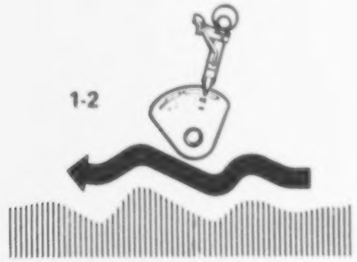
   (a) For roads and level terrain, select range 1-3.



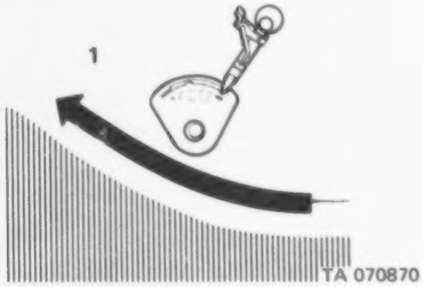
   (b) For hilly terrain, select range 1-3.



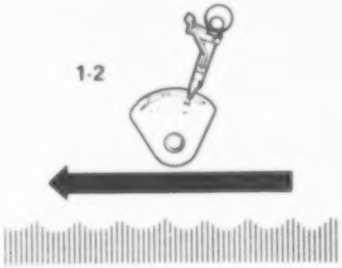
   (c) For rough terrain and trenches, select range 1-2.



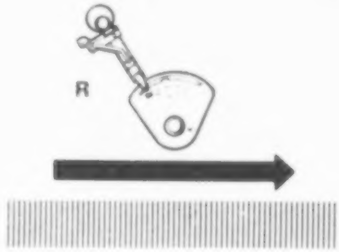
   (d) For steep grades, and entering or leaving water, select range 1.



(e) For swimming, select range 1-2.



(f) For reverse, select R whether in water or on land.



6. If tactical situation permits, sound the horn to alert personnel.
7. Pull back on both differential steering levers to release brakes, keeping thumbs off the lock buttons; then push both levers forward.
8. Press gas pedal slowly and evenly. Control speed and direction with the gas pedal and the steering levers.

NOTE

If the gas pedal is pressed through full throttle detent, the transmission will remain in the same gear as the vehicle accelerates or will downshift to lower gear for more power. The transmission cannot upshift until the gas pedal is released.

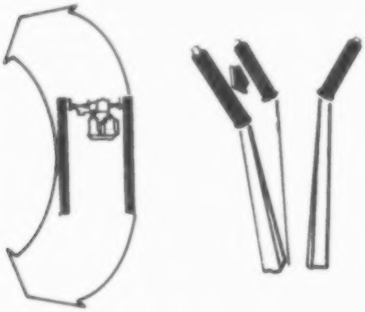
TA 070871

DRIVING

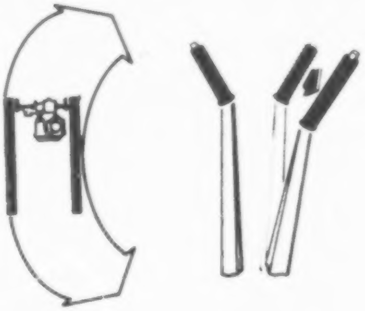
DIFFERENTIAL STEERING AND BRAKING

1. When moving forward or in reverse, the vehicle will always turn toward the track that's moving the slowest.

Pull back on the left-hand steering and braking lever to turn LEFT.

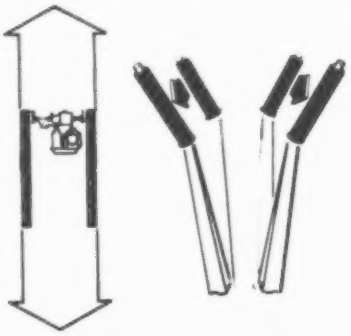


Pull back on the right-hand steering and braking lever to turn RIGHT.

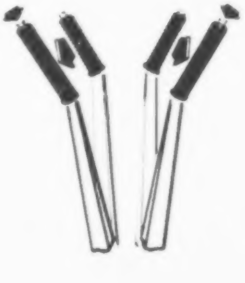


Use caution when pulling the lever. A harder pull will result in a quicker turn.

2. To slow the vehicle, release the gas pedal and pull back equally on both levers, using a pumping movement. To stop the vehicle release pedal and pull back equally on both levers, using a hard, steady pull.



3. To lock the brakes for parking, pull both levers back tightly and depress the lock buttons on top of the hand grips. To release the brakes, pull back on the levers keeping thumbs clear of lock buttons, then release the levers.



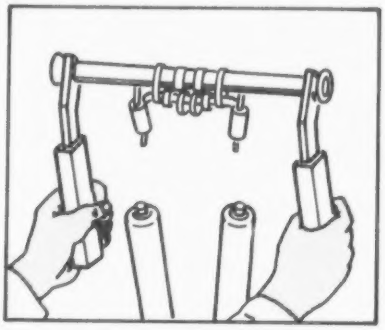
TA 157884

PIVOT STEERING AND BRAKING

CAUTION

Unless it's an emergency, NEVER use the pivot steer brakes when you're going faster than 15 mph, or in a driving range higher than 1-2. Never use the pivot steer brakes and differential brakes at the same time - that's a sure way to mess up the differential.

The pivot steer brakes work like the differential brakes, only more so. They're disk brakes, and when you pull the handle, they lock up right now.



Pull the left handle to pivot LEFT.

Pull the right handle to pivot RIGHT.

Pull both handles to make a sudden stop from a slow speed. You can use the pivot brakes if the differential brakes fail, but if you're moving very fast something could break.

TA 157885

DRIVING

GEAR SHIFTING

R RANGE

Use for backing up under all conditions.

N RANGE

Use Neutral Position for starting, idling, and operating the auxiliary equipment.

2-3 RANGE

Use for high-speed driving on roads or level terrain when the carrier is lightly loaded.

1-3 RANGE

Use for normal driving on roads and level or rolling terrain.

NO DOWNSHIFT TO THIS RANGE ABOVE 40 MPH

1-2 RANGE

Use for rough or soft terrain, going up or down long or moderately steep grades, and driving in the water.

NO DOWNSHIFT TO THIS RANGE ABOVE 21 MPH

1 RANGE

Use for going up or down steep grades, and entering or leaving the water.

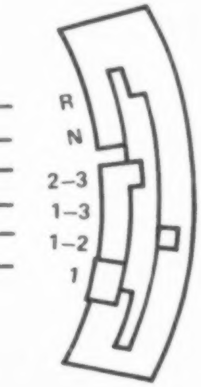
NO DOWNSHIFT TO THIS RANGE ABOVE 10 MPH

CAUTION

Don't downshift at speeds faster than shown on this page.

CAUTION

Before shifting to the R (reverse) range, stop the carrier and let the engine return to 650 – 700 rpm.



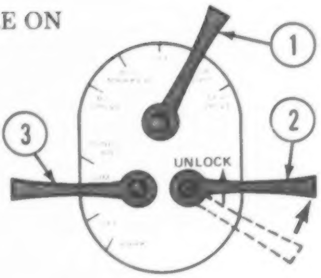
NOTE

Move the shift lever sideways against its spring to guide it through the shift gates. Be sure to lift the lever over the gate stop when you shift from 1-2 to 1 range.

TA 157886

VEHICLE LIGHTS

DAYTIME DRIVING — BRAKE LIGHTS ONLY ARE ON

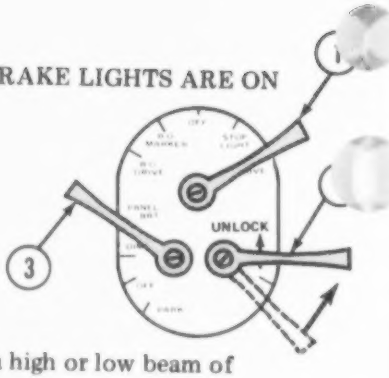


1. Turn the spring-loaded UNLOCK switch (2) up and hold.
2. Turn the main light switch (1) to STOPLIGHT.
3. Release the UNLOCK switch
4. Turn the panel light switch (3) to DIM, PANEL, BRT., or leave in OFF as desired.

TA 157887

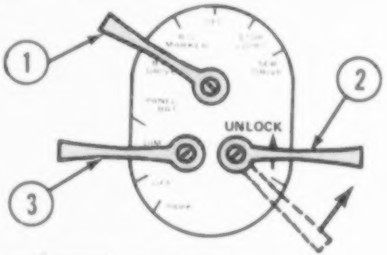
VEHICLE LIGHTS - Continued

NORMAL NIGHT DRIVING — HEADLIGHTS AND BRAKE LIGHTS ARE ON

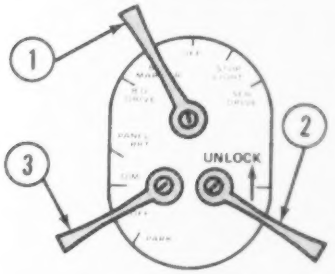

1
2
3
OFF
B.O. MARKER
STOP LIGHT
B.O. DRIVE
PANEL BRT
UNLOCK
DIM
OFF
PARK

1. Turn the spring-loaded UNLOCK switch (2) up and hold.
2. Turn the main light switch (1) to SER. DRIVE and release the UNLOCK switch.
3. Turn the panel light switch (3) to PANEL BRT.
4. Depress the dimmer switch on the floor board for a high or low beam of headlights as needed.

DRIVING AT NIGHT UNDER BLACKOUT CONDITIONS — BLACKOUT DRIVING LIGHT AND BLACKOUT MARKERS ARE ON


1
2
3
OFF
B.O. MARKER
STOP LIGHT
B.O. DRIVE
SER DRIVE
PANEL BRT
UNLOCK
DIM
OFF
PARK

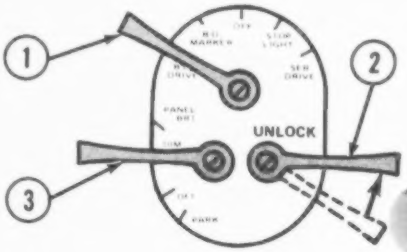
1. Turn the spring-loaded UNLOCK switch (2) up and hold.
2. Turn the main light switch (1) to B.O. DRIVE and release the UNLOCK switch.
3. Turn the panel light switch (3) to DIM.
4. Set the I.R.-B.O. SELECT on the driver's control panel to B.O.


1
2
3
OFF
B.O. MARKER
STOP LIGHT
B.O. DRIVE
SER DRIVE
PANEL BRT
UNLOCK
DIM
OFF
PARK

TEMPORARY STOPS (BLACKOUT CONDITIONS) — ONLY BLACKOUT MARKERS ARE ON

1. Turn the main light switch (1) to B.O. MARKER.
2. Turn the panel light switch (3) to OFF or DIM as desired.

DRIVING AT NIGHT, USING THE IR PERISCOPE


1
2
3
OFF
B.O. MARKER
STOP LIGHT
B.O. DRIVE
SER DRIVE
PANEL BRT
UNLOCK
DIM
OFF
PARK

1. Install the M-19 infrared (IR) periscope.
2. Turn the spring-loaded UNLOCK switch (2) up and hold.
3. Turn the main light switch (1) to B.O. DRIVE and release the UNLOCK switch.
4. Turn the panel light switch (3) to DIM.
5. Set the I.R.-B.O. SELECT switch on the driver's control panel to I.R.

TA 070875

VEHICLE LIGHTS

CAUTION

When stopping the vehicle on the side of the road or highway under other than blackout conditions, leave the headlights on and apply brakes until other measures, as required by local traffic regulations, are taken to warn other motorists. Turn off all lights when the vehicle is permanently parked in the motor pool.

OPERATING THE RAMP

The ramp at the rear of the vehicle is hydraulically operated and can be raised or lowered from the operator's compartment. The controls consist of an actuating lever and a locking handle.

NOTE

It is possible, but not desirable, to lower the ramp with the engine off. The engine must be started to raise the ramp.

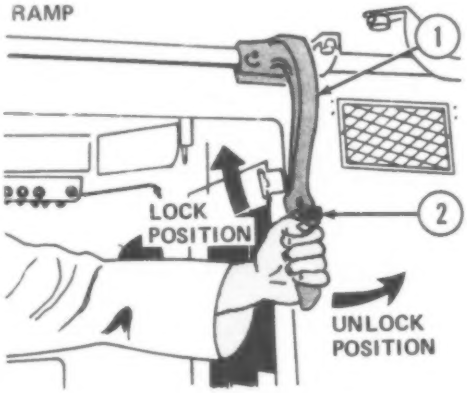
LOWERING THE RAMP

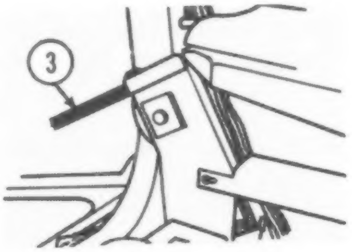
1. Inspect the ramp cable (3) and make sure the personnel door is closed and latched.

WARNING

Do not release the ramp lock handle if the cable is slack or disconnected.

2. Start the engine (if practical).
3. Adjust the hand throttle control to obtain an engine speed of approximately 1,500 rpm.
4. Press the latch (2) to unlock the handle (1) and move the handle to the unlocked position.





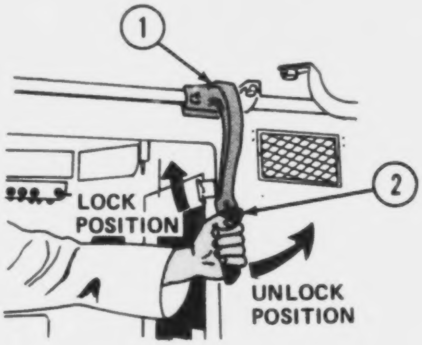
TA 070876

OPERATING THE RAMP

WARNING

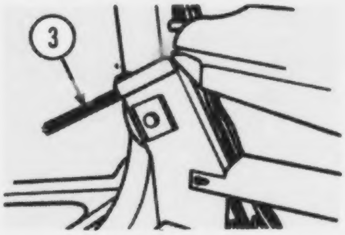
Sound the horn to alert all personnel in and around the vehicle (if tactical situation permits).

5. Move the ramp actuating lever (4) forward.
6. Return the locking handle (1) to locked position after the ramp has been lowered.
7. Push in the hand throttle to return engine speed to idle.



RAISING THE RAMP

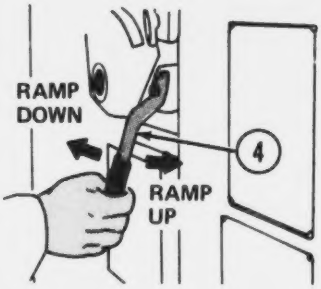
1. Inspect the ramp cable (3).



WARNING

Sound the horn to alert all personnel in and around the vehicle (if tactical situation permits). Make sure that the ramp personnel door is closed and locked.

2. Start the engine.
3. Adjust the hand throttle control to obtain an engine speed of approximately 1,500 rpm.
4. Move the ramp locking handle (1) to the unlocked position. Press the latch (2) to unlock the handle.
5. Pull back the ramp actuating lever (4).



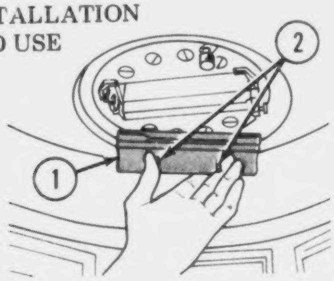
6. Return the locking handle to the locked position after the ramp has been raised.
7. Push in the hand throttle to return engine speed to idle.

TA 157888

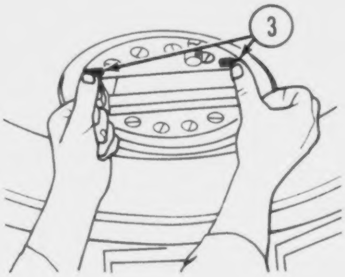
THE M19A1 INFRARED (IR) PERISCOPE

The infrared periscope is used for driving the vehicle at night and during other periods of low visibility. When not in use, the periscope is stowed in the stowage bracket on the left side of the MASTER SWITCH control panel. When not in use, cover eyepieces with the lens protector provided.

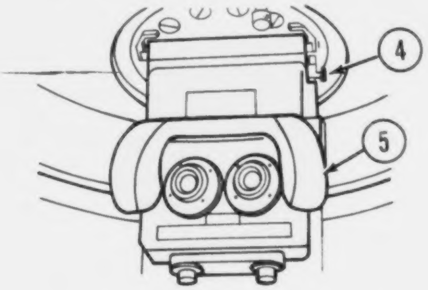
INSTALLATION AND USE



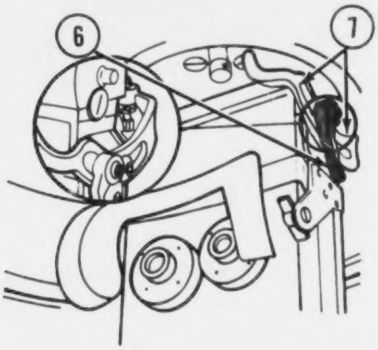
1. Remove the plug (1) from quick release by pressing levers (2) together, lifting the plug up and then bringing it down through the opening.



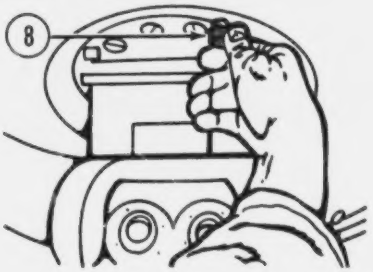
2. Push both periscope latches (3) upward and retract the locking thumbscrew (4).
3. Carefully insert the periscope (5). While pushing upward, pull back at the same time.



4. Turn the locking thumbscrew (4) clockwise to secure the periscope in quick release.



5. Release the elevation locking lever (6) and adjust the arm (7) so that both ends of arm contact quick release.



6. Loosen the azimuth locking knob (8) and rotate the periscope, making sure it traverses smoothly.

TA 159175

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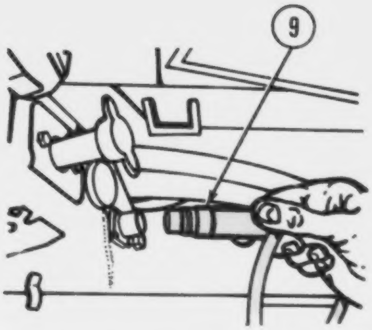
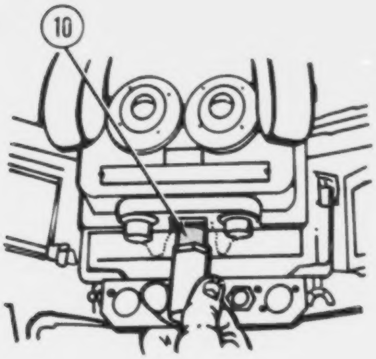
M19A1 INFRARED (IR) PERISCOPE

7. Remove the IR periscope cable (9) from stowed position.



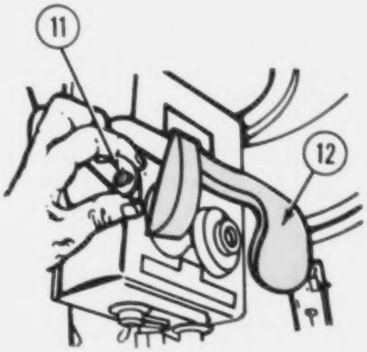


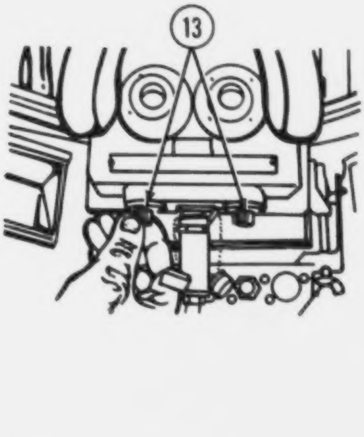
8. Connect the cable to the IR periscope receptacle (10). Turn MASTER SWITCH and IR POWER switch to ON. Place the main light switch to B.O. DRIVE and I.R.-B.O. SELECT switch to I.R.

9. Loosen the left and right clamp screws (11) and adjust the headrest (12).

10. Adjust the IR periscope in azimuth and tighten the locking knob (8).

11. Adjust the IR periscope in elevation and tighten the locking lever (6).





12. Focus each eyepiece with an adjusting screw (13).

13. Lean forehead on headrest and look through the eyepiece while operating the vehicle.

TA 159176

M19A1 INFRARED (IR) PERISCOPE

REMOVAL AND STOWAGE

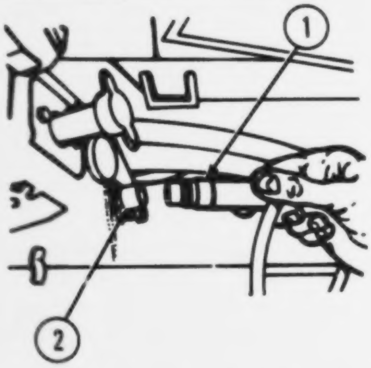
When not needed remove and stow the sight as follows:

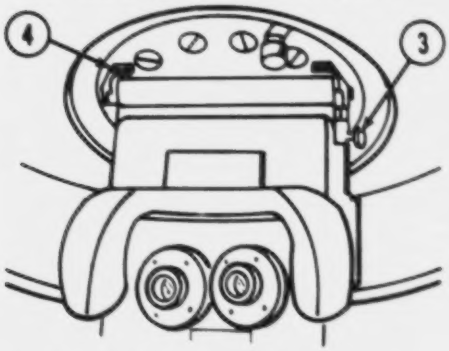
WARNING

HIGH VOLTAGE IN THE M19 PERISCOPE CAN CAUSE SERIOUS INJURY OR DEATH. VOLTAGE COULD EXCEED 16,000 VOLTS. TO AVOID ACCIDENTS:

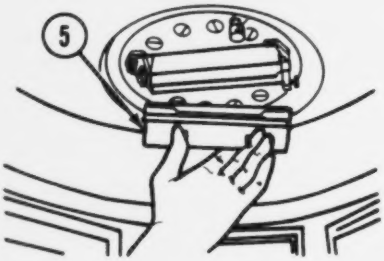
- During each removal, wait at least two minutes after turning off the I.R. POWER switch BEFORE disconnecting the power cable.
- **Do not disconnect the power cable until the image disappears from the periscope screen.**
- **Never touch the end of the power cable, or allow it to contact metal surfaces.**

1. Turn off the main light switch and the I.R. POWER switch on the driver's control panel and wait at least two minutes before going to step 2.
2. **Remove the cable (1) from the periscope and immediately place it in the stowage receptacle (2) on the MASTER SWITCH panel.**



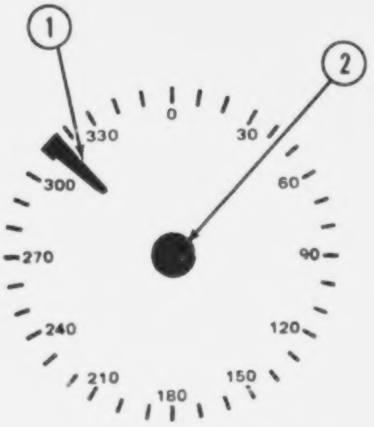


3. **Turn the locking thumbscrew (3) counterclockwise to disengage the periscope from the quick release.**
4. **Push up on both the left and right latches (4).**



5. **Carefully lift out and secure the periscope on the stowage bracket, on the left side of the MASTER SWITCH panel.**
6. **Replace the plug (5) in the quick release.**

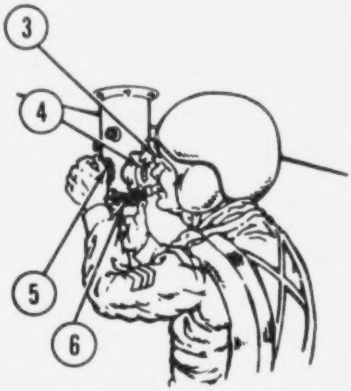
SQUAD LEADER'S PERISCOPE



The squad leader's periscope contains degree reference lines and numbers, a position indicator (1), and 4 stadia lines (2). The two center stadia lines are 3 milliradians apart; distance between outer stadia lines is 8 milliradians.

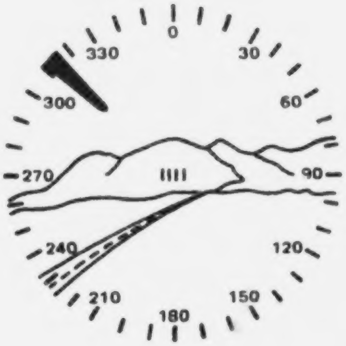
The squad leader's periscope is used to search the area for enemy activities and to estimate the distance to targets.

AREA SEARCH AND TARGET ACQUISITION



1. Look into the eyepiece (3).
2. Focus the periscope by adjusting the focus control (4) for a clear image of an object at the edge of the field.
3. Turn the azimuth control handle (6) clockwise or counterclockwise to search the area for enemy activity (3 rotations of the handwheel cause the line of sight to rotate 360 degrees in azimuth).
4. Turn the elevation knob (5) clockwise to raise the line sight, counterclockwise to lower it.

ESTIMATING DIRECTION AND DISTANCE TO TARGET

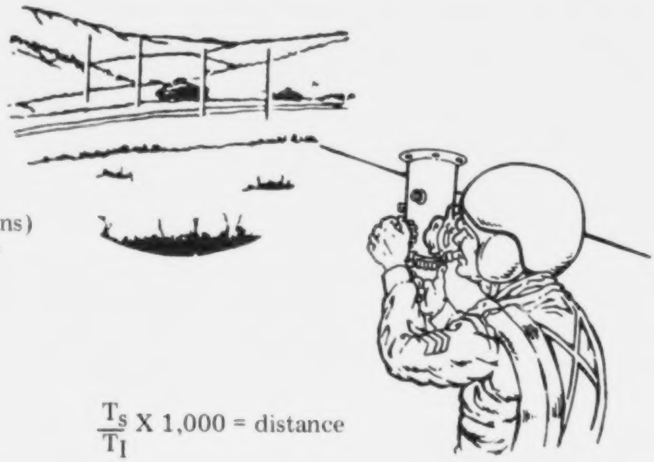


1. Determine the direction to the target by the position of the indicator.

TA 070881

SQUAD LEADER'S PERISCOPE

2. Estimate distance to target by the formula below (distance can also be read from table):



Example 1:

A six meter long tank (viewed broadside) bounded by the inner stadia lines (3 milliradians) would be 6/3 X 1,000 = 2,000 meters from the vehicle.

Example 2:

A three meter wide tank (viewed head on) bounded by the inner stadia lines (3 milliradians) would be 3/3 X 1,000 = 1,000 meters from the vehicle.

$$\frac{T_s}{T_I} \times 1{,}000 = \text{distance}$$

T_s is the actual size of the target (e.g. a T-62 is 6 meters long).

T_I is the apparent size of the target (what it looks like in the squad leader's periscope).

Distance in Meters

Estimated Size of Target (meters)	1	2	3	4	5	6	7	8
30	30000	15000	10000	7500	6000	5000	4286	3750
28	28000	14000	9333	7000	5600	4666	4000	3500
26	26000	13000	8666	6500	5200	4333	3714	3250
24	24000	12000	8000	6000	4800	4000	3427	3000
22	22000	11000	7333	5500	4400	3666	3143	2750
20	20000	10000	6666	5000	4000	3333	2857	2500
18	18000	9000	6000	4500	3600	3000	2571	2250
16	16000	8000	5333	4000	3200	2666	2286	2000
14	14000	7000	4666	3500	2800	2333	2000	1750
12	12000	6000	4000	3000	2400	2000	1714	1500
10	10000	5000	3333	2500	2000	1666	1428	1250
8	8000	4000	2666	2000	1600	1333	1143	1000
6	6000	3000	2000	1500	1200	1000	857	750
4	4000	2000	1333	1000	800	666	571	500
2	2000	1000	667	500	400	333	285	250

Apparent Size of Target Image (milliradians)

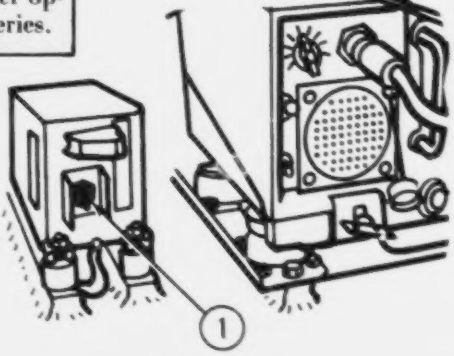
TA 070882

COMMUNICATIONS EQUIPMENT

The mechanized infantry vehicle communications system consists of Intercom Set AN/VIC-1(V), Radio Set AN/GRC-160, and Telephone Set TA-312/PT. The armored cavalry communications system consists of the same Intercom Set AN/VIC-1(V), Radio Set AN/VRC-64, and Telephone Set TA-1.

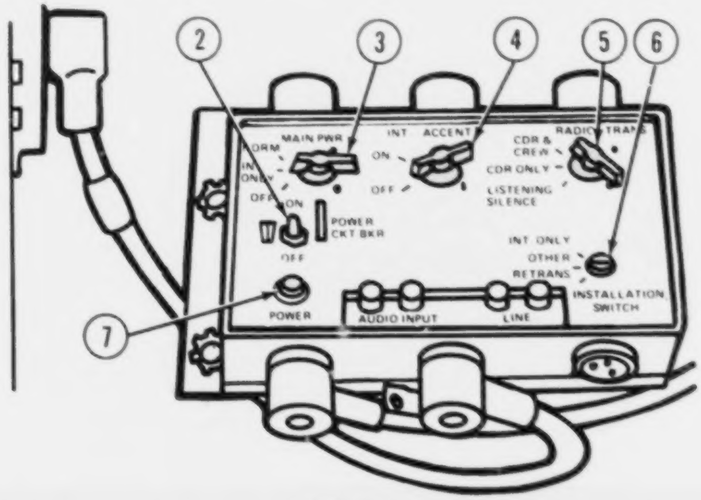
CAUTION

Do not start vehicle with radio or intercom energized. Be sure to turn them off after operation to prevent drain of vehicle batteries.



OPERATING THE INTERCOM ONLY

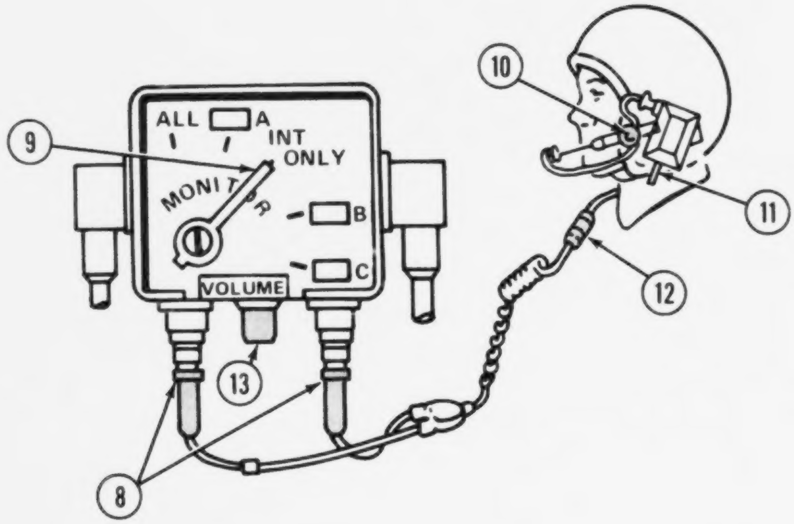
1. Turn on power at the electrical transient suppressor ON/OFF switch (1).
2. Turn MAIN PWR switch (3) to INT ONLY.
3. Turn POWER CKT BKR (2) to ON.
4. Look for POWER lamp (7) to light.


2
3
4
5
6
7
MAIN PWR
ORM
IN
ONLY
OFF
ON
OFF
POWER CKT BKR
INT ACCENT
ON
OFF
RADIO TRANS
CDR & CREW
CDR ONLY
LISTENING SILENCE
INT ONLY
OTHER
RETRANS
INSTALLATION SWITCH
POWER
AUDIO INPUT
LINE

NOTE

Positions of the INT ACCENT (4) and RADIO TRANS switch (5) are not important for this procedure. The INSTALLATION SWITCH (6) is set to OTHER by support maintenance and is not an operator control.

TA 157889



5. Connect the CVC helmet leads (8) to intercom control C-2298/VRC. (The gunner connects his CVC helmet to the fire interrupt/intercom assembly; other members to their respective stations.)

NOTE

The long lead always goes to the left connector. The long lead is also color coded with a yellow band to indicate that it goes to the connector with the yellow mark.

6. Turn the MONITOR switch (9) to INT ONLY.

7. Put on the CVC helmet, making sure the quick disconnect connector (12) is properly connected.

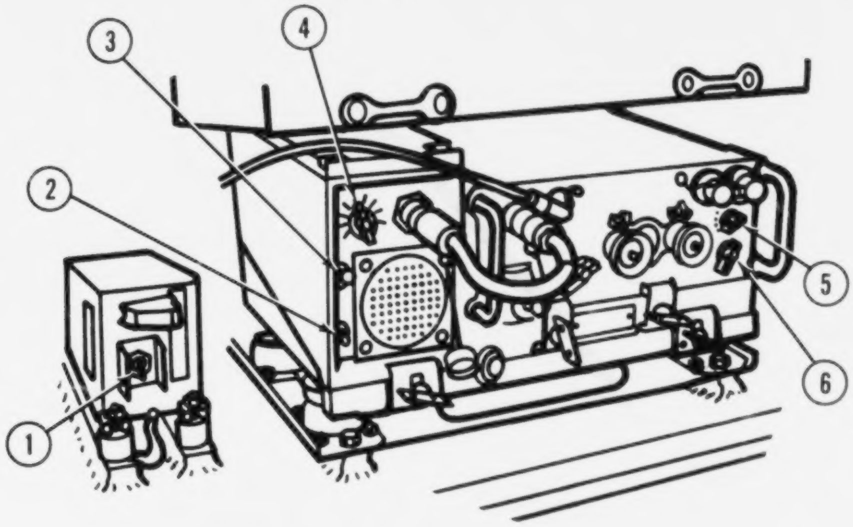
8. Place the control handle (11) to the rear position and perform a communications check with each crew member.

9. Adjust the mike at the adjustment screw (10), and the volume at the volume control knob (13), as necessary.

TA 070884

COMMUNICATIONS EQUIPMENT

OPERATION OF INTERCOM SYSTEM WITH RADIO



1. If the vehicle battery is low, turn on the vehicle engine to prevent an excessive drain of the batteries.

2. Turn the circuit breaker ON/OFF switch (1) to ON.

3. Set the PWR switch (2) to ON, and the function switch (6) to ON or SQUELCH.

4. Set the SPKR switch (3) to OFF.

5. Turn the VOLUME control (5) down.

6. On the intercom amplifier, turn the MAIN PWR switch (9) to NORM, the INT ACCENT switch (10) to ON, and the POWER CKT BKR (8) to ON. (The POWER lamp (7) should light.)

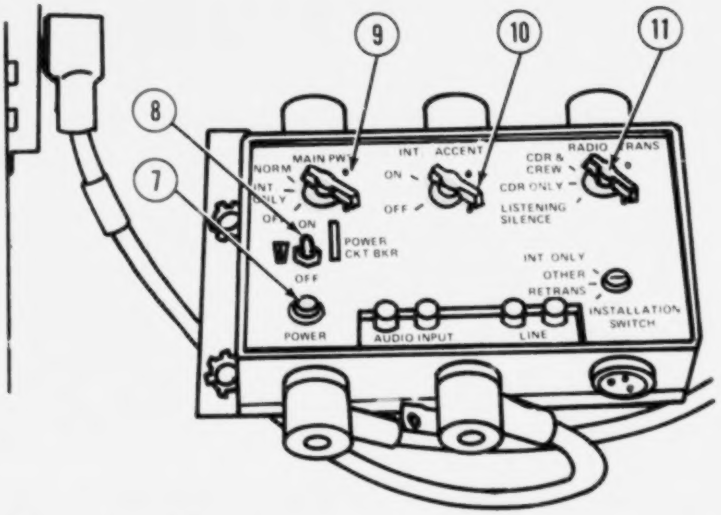
7. Turn the RADIO TRANS switch (11) to the following positions:

   a. CDR & CREW if it is desirable that all crew members listen and talk on the radio.

   b. CDR ONLY if only the squad leader and the gunner are to talk; all others are able to listen.

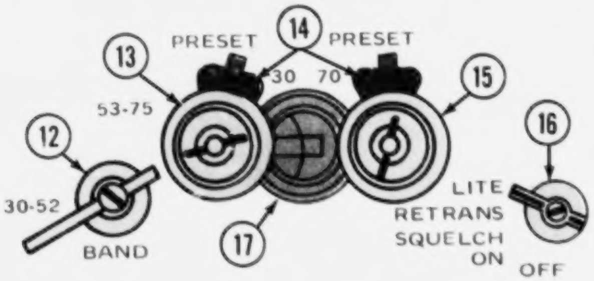
   c. LISTENING SILENCE if it is desired that the crew does not transmit, but is able to listen.

TA 070885


9
10
11
8
7
MAIN PWR
NORM
INT ONLY
OFF
ON
OFF
POWER CKT BKR
POWER
INT ACCENT
ON
OFF
RADIO TRANS
CDR & CREW
CDR ONLY
LISTENING SILENCE
INT ONLY
OTHER
RETRANS
INSTALLATION SWITCH
AUDIO INPUT
LINE

8. Set frequencies as follows:

   a. Set the ANT FREQ CONTROL (4) to click stop between the frequencies containing the assigned frequency. The frequency switch on the bottom of the antenna matching unit will automatically go to the same frequency. (The stepping switch makes an audible clicking sound.)


14
PRESET
PRESET
13
30
70
15
53-75
12
16
30-52
BAND
17
LITE
RETRANS
SQUELCH
ON
OFF

   b. Set the BAND switch (12) to the span of frequency (30—52 or 53—75) which includes assigned frequencies.

   c. If the frequency is not preset (14), turn the MHz (13) and the kHz knobs (15) until the correct frequency is seen in the dial window (17). To light the dial window, turn the function switch (16) up to LITE.

   d. If the frequency has been preset, select frequency as follows:

      (1) Select high or low band on the BAND switch (12), as appropriate.

TA 157890

(2) Turn the MHz knob (13) clockwise as far as it will go to select the high MHz frequency, counterclockwise to select the low MHz frequency.

(3) Turn the kHz knob (15) clockwise to select the high kHz frequency, counterclockwise to select the low kHz frequency.

EXAMPLE:	High preset frequency	Low preset frequency
	65.80	34.20

To select the high preset frequency (65.80), turn the MHz knob clockwise and the kHz knob clockwise; and turn the BAND switch to high band (53-75). To select the low preset frequency (34.20), turn the MHz knob counterclockwise and kHz knob counterclockwise and select the low band (30-52).

e. Preset the two assigned frequencies as follows:

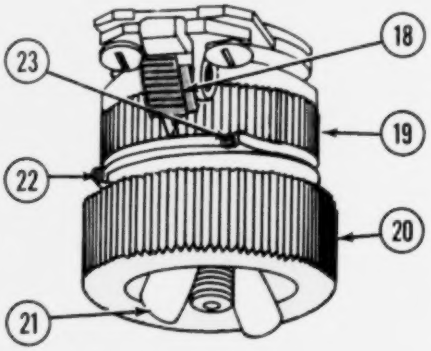
NOTE

For ease of understanding assume that the frequencies to be set are 65.80 and 34.20 as above.

(1) Push both PRESET tabs (18) up (away from knobs).

(2) Turn the BAND switch (12) to the position which includes low frequency (position 30-52).

(3) Set the MHz frequency with the MHz knob to the lower of the two frequencies (34 MHz). Pull the MHz tab (18) down on the MHz knob.



(4) Loosen the wing nut (21) on the MHz knob and pull out the lower section (19) enough so it will rotate without disturbing the frequency in the window. (Turn it to bring the stop (23) up against the tab, then let it settle back to its normal position.)

(5) Set the low kHz frequency (20 kHz) in the kHz window by rotating the kHz knob.

TA 157891

(6) Loosen wing nut (21) on kHz knob and pull out lower section of knob. Rotate it to bring stop up against tab without disturbing the frequency set in window.

(7) Turn BAND switch (if necessary) to include high assigned frequency (53-75 in example on page 2-126).

(8) Turn lower section of MHz knob to change reading in MHz window to higher MHz frequency (65 MHz). Rotate top knob and bring stop (22) up against the tab. Tighten wing nut (21).

(9) Turn lower section of kHz knob to change to higher kHz frequency (80 kHz). Turn upper knob (20) till stop (22) contacts tab and tighten wing nut.

(10) Put on CVC helmet and install as described under procedure for operating the intercom set only.

(11) Turn MONITOR switch to either ALL, A, or B.

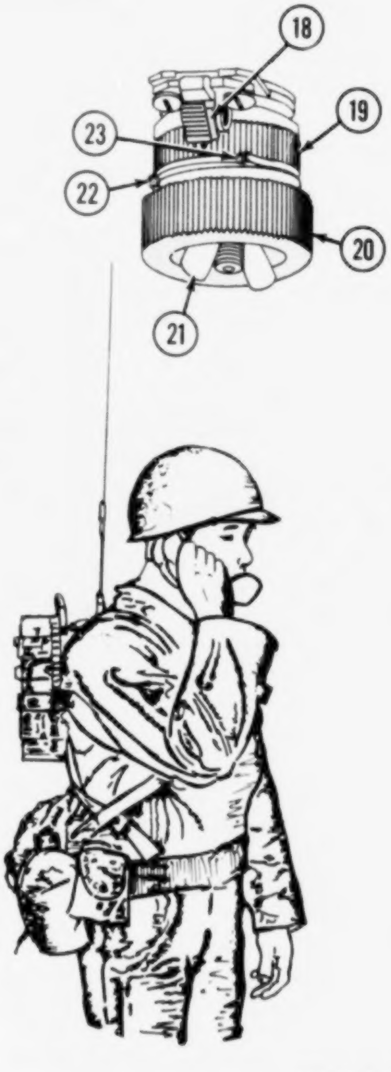
(12) Perform a communications check with distant station and communicate in accordance with unit SOP. Talk on radio with CVC switch handle forward; listen with switch in rear position. Listen and talk on intercom with switch in the rear position.

OFF-VEHICLE OPERATION OF THE RADIO SET

Radio communication is possible without the vehicle if the vehicle is equipped with the AN/GRC-160 Radio Set.

Removal of Receiver-Transmitter from Vehicle.

1. Turn the circuit breaker ON/OFF switch to OFF.



TA 070888

COMMUNICATIONS EQUIPMENT

2. Turn PWR switch on radio to OFF.

3. Remove the antenna wire and the cable (if on), tying the receiver-transmitter to the amplifier-power supply.

4. Loosen clamps holding receiver-transmitter to amplifier-power supply and lift out receiver-transmitter. Leave amplifier-power supply in place.

Assembly and Use.

1. Remove battery box (1), install battery (3), replace battery box (1) and latch shut with clamps (2).

2. Install the receiver-transmitter in Harness ST-138/PRC-25 (4). The crew member can now operate the radio in a dismounted configuration.

3. Install Antenna Support AB-591/PRC-25 and Antenna AT-27A/PRC-25 or Antenna AT-892/PRC-25 on antenna mount (9).

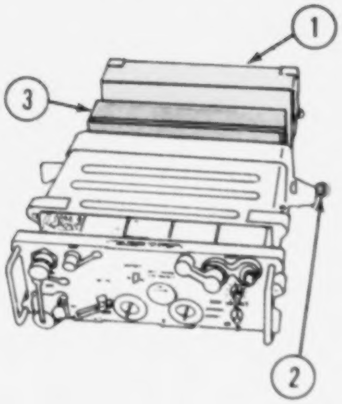
4. Connect handset to either one of the AUDIO connectors (6).

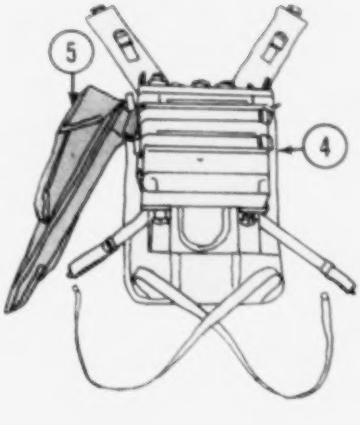
5. If frequency is not set, set it as described in procedure for on-vehicle operation.

6. Turn function switch (8) to ON or SQUELCH.

7. Set volume control (7) as needed to hear clearly.

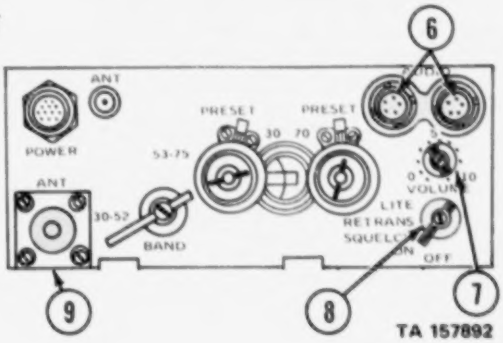
8. Perform a communication check with a distant station. Press the handset switch to talk, and releasing it to listen.





NOTE

The longer, folded antenna is for communication over greater distances. Antennas and other accessories are carried in bag (5).



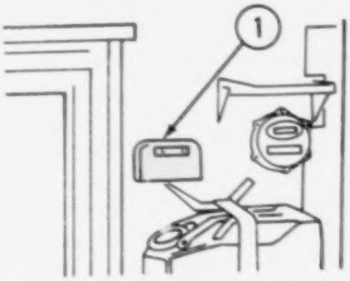
TA 157892

COMMUNICATIONS EQUIPMENT

TELEPHONE COMMUNICATIONS

The telephone system consists of Field Telephone Set TA-312/PT for mechanized infantry vehicles (the TA-1 for vehicles of the armored cavalry) and Telephone Cable WD-1/DR8 with Reeling Machine RL-39. It is used to communicate over short distances by wire.

Installation and Use.



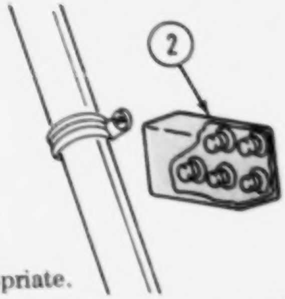
1. Tie the loose end of the wire to a convenient place on the vehicle, leaving enough slack to connect to the telepost connectors (1). Screw down connectors on bare wire ends. Holding the RC-39, lay wire to the switchboard or other station where communication is to be established.
2. Distant station equipment should be connected to the terminals on the wire reel, DR-8, or the wire line which has been installed.
3. Connect two short pieces of wire between telepost connectors (2) on inside of vehicle to a telephone, or the line input terminals of the intercom amplifier, if used.
4. Install two "D" size batteries in telephone set.

CAUTION

Voltages generated by handcranking the telephone ringer can reach 100 Vac and above. Warn external users of the communication system not to use the ringer if it is tied to the intercom, as this could cause damage to the intercom amplifier. Talk loudly or whistle to get attention.

5. Turn crank rapidly to signal the distant station; then lift off receiver and perform a communications check.

Disassembly and Retrieval of Wire.



1. Disconnect wire at telepost (1) and the distant station.
2. Turn crank on reeling machine to retrieve wire. (To ease operations, the straps should be worn while using the RL-39 and recovering wire lines.)
3. Remove inside wires or leave in place as appropriate.
4. Remove batteries from telephone receiver if telephone is not expected to be used for a while.
5. Secure telephone in carrying case.

TA 157893

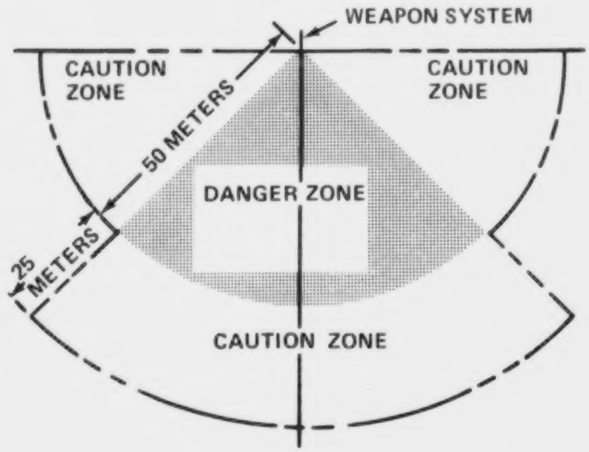
MISSILE FIRING SAFETY

Safety cannot be overemphasized when working with explosives. Caution or warning notes have been inserted into the operating procedures at that point at which they are most needed. These have been kept short so as not to take from the procedures. This paragraph gives a more detailed explanation of the dangers involved. Many of these are overcome by built-in safety features, but for the most part safety comes about through a conscious, deliberate effort on the part of the operator: Know the dangers involved and learn how to avoid them.

BACKBLAST CAUTION AND DANGER ZONES

A danger zone exists to the rear of the launch tube and extends to a distance of 50 meters; 45 degrees to the left and right of the direction of the backblast. Personnel in this area could be seriously injured from the backblast of the missile and from flying debris. They should not be allowed there unless this is unavoidable because of an extreme combat emergency.

In addition to the above danger zones, there are three caution zones as shown. In these zones, the danger is not quite as serious; personnel in these zones should be fairly safe if they wear ear protectors and face away from the blast. However, personnel should not be allowed in this area either, unless absolutely necessary and personnel are aware of the dangers involved.



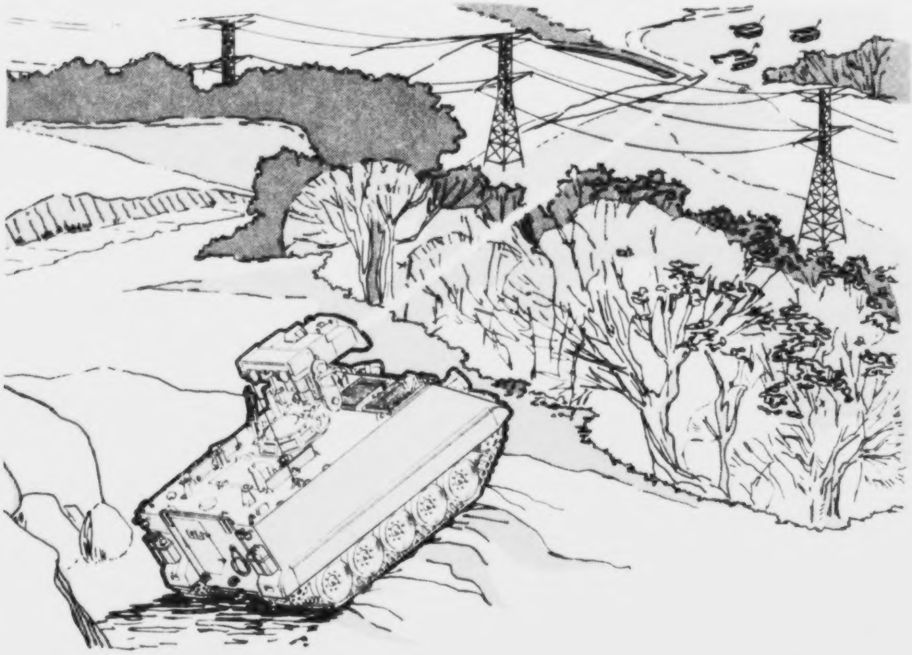
TA 070891

MISSILE FIRING SAFETY

FLIGHT PATH OBSTRUCTIONS

The TOW missile receives guidance command signals over the two guidance wires which are fed out from the rear of the missile when fired. If these wires are broken or burned by firing through dense brush, tree limbs, brush fires, and other obstructions, the missile command signals are interrupted and the missile will probably miss the target.

These command link wires are made of steel, which conducts electricity. Extreme caution should be used to avoid firing over live power lines, telephone lines, and other sources of high voltages since these pose a severe threat to the operator.



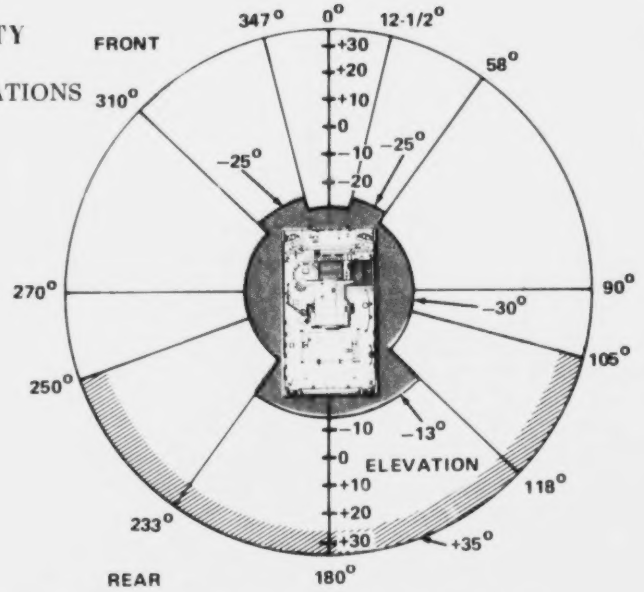
TA 070892

MISSILE FIRING SAFETY

FIRING ANGLE LIMITATIONS

NOTE

Mechanical stops prevent the launcher from being elevated and fired above +35 and below –30 degrees in elevation at any azimuth.



Between –13 and +35 degrees in elevation the launcher may be fired at any azimuth within 360 degrees. However, to prevent firing into the vehicle, three no-fire zones have been established as follows:

AZIMUTH	ELEVATION
12.5° to 58°	below –25°
118° to 233°	below –13°
310° to 347.5°	below –25°

A FIRE INTRPT light on the gunner's, control panel and a buzzer on the fire interrupt/intercom assembly warn the gunner when the launcher is pointed at any of these directions. A missile cannot be fired in these zones unless the OVERRIDE switch is used.

WARNING

Do not use the OVERRIDE switch to override a firing angle limitation unless justified by an extreme emergency.

CAUTION

Do not fire in the caution zone as this may cause damage to the engine and/or trim vane.

In addition to the above no-fire zones, a missile should not be fired between 250 – 105 degrees in azimuth and above 24 degrees in elevation. To do so could cause the backblast to enter the engine compartment, damaging the engine. Poisonous fumes may also enter the crew compartment through the engine access panels.

TA 070893

MISSILE FIRING SAFETY

HATCH/FIRE INTERRUPT

A hatch/interrupt lamp will light when either the gunner's hatch, the driver's hatch, the cargo hatch, or any combination of the three are open.

The gunner's control panel will indicate which of the three are open. Certain other functions as indicated are also inhibited when hatches are open.

Some of these can be overridden as shown in the table by the use of the OVERRIDE switch.

However, as in the case of the firing angle limitations, use of the override switch should be limited to extreme emergencies such as could occur under combat conditions.

NOTE

Positioning the OVERRIDE switch to OVERRIDE will also allow arming of the 2nd missile, although the other one is not safe.

Condition	Functions Inhibited						Remarks
	Erect	Sel/Arm	Fire	Stow	Load	Track/Slew	
Driver's Hatch Open			Ⓧ			Ⓧ	Driver's hatch and fire interrupt lights on. Alarm sounds when selected.
Gunner's Hatch Open			Ⓧ		X	Ⓧ	Gunner's hatch and fire interrupt lights on. Alarm sounds when selected.
Cargo Hatch Open	N/A		Ⓧ	X			Cargo hatch and fire interrupt lights on. Alarm sounds when selected.
Cargo Hatch Fully Open	N/A		Ⓧ				Cargo hatch and fire interrupt lights on. Alarm sounds when selected.

Legend

X Indicates inhibited function.

Ⓧ Indicates inhibited function, but override is possible.

TA 070894

MISSILE FIRING SAFETY

DEPRESSURIZING THE HYDRAULIC SYSTEM

Hydraulic pressure is maintained constant by the accumulator and the hydraulic pump with turret power on. This pressure is necessary to keep the launcher safely in the erected position. Shutting it down would remove the erection locks and could result in injury to personnel and damage to equipment. However, the turret may be safely turned off in the erected position if the hydraulic pressure is relieved (bled down) as follows:

1. Turn the EMER PWR switch on (up position).
2. Move the hand controls to elevate the launcher all the way up (elevation load light will come on). Then depress the launcher all the way down and hold it until the pressure is bled.
3. Make sure that the pressure in the accumulator has been relieved. (Pressure gage should read between 850 — 1100 psi, depending on temperature within vehicle.)
4. Position the TURRET POWER switch to OFF.

NOTE

Launcher must be fully depressed to open gunner's hatch.

5. Open the gunner's hatch and check the hydraulic fluid. Fluid should be to the scribe mark on the dipstick.

NOTE

Although the upper erection lock may disengage if vehicle is shut down for an extended period, this represents no problem. The lower locks will still be engaged and will hold the launcher indefinitely.

6. To restore hydraulic pressure, position the TURRET POWER switch to ON and the EMER PWR switch to OFF.

TA 157894

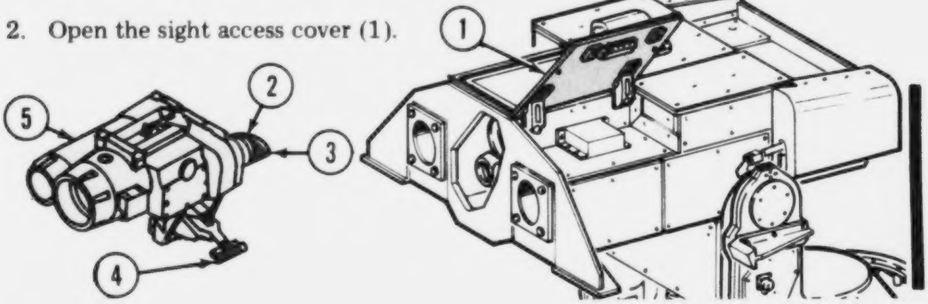
TURRET AND FIRE CONTROL EQUIPMENT

INSTALLATION OF DAYSIGHT/TRACKER

WARNING

Serious eye burn can result from looking at the sun or at bright lights through optical instruments. Do not look at the sun or other sources of bright light while sighting through the daysight/tracker or ITA eyepiece.

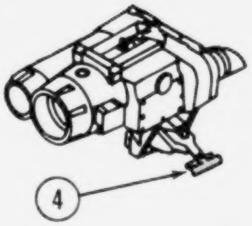
1. Place the launcher in its stowed position.
2. Open the sight access cover (1).

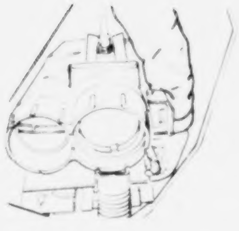


3. Remove the eyeguard (3) from the daysight/tracker (5) and stow in nightsight carrying case.
4. Turn the focusing ring (2) all the way in for clearance.
5. Ensure latch lever (4) is all the way down.

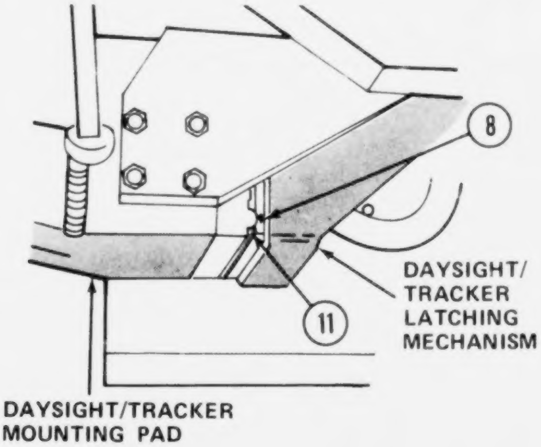
TA 157895

7. While holding sight in position with left hand, reach down over sight for latching lever (4). Pull latching lever up until it snaps into place.





8. Try to shake the daysight/tracker to make sure it is properly seated. Also look under the launcher to see if horizontal V-way (11) of launcher mounting plate engages horizontal groove (8) in daysight/tracker index plate. Repeat installation procedure if sight is loose or V-way and groove do not aline properly.



9. Turn focusing ring of daysight/tracker to zero. (Index mark points up.) Make sure the rubber adapter alines with the eyepiece on the daysight/tracker and does not get into the way.

TA 157897

TURRET AND FIRE CONTROL EQUIPMENT

INSTALLATION OF NIGHTSIGHT

WARNING

The anti-reflective coating on all infrared optics contains thorium fluoride which is slightly radioactive. The only potential hazard is swallowing or inhaling this coating material. Dispose of broken lenses in accordance with AR755-15.

CAUTION

Do not remove lens protector from front of nightsight except for boresighting, tracking, and firing. It must be on during travel to keep dirt and dust from front lens.

On the M901, a coolant cartridge (full or empty) and battery must be installed on the nightsight at all times except when exchanging cartridges or batteries. This prevents contaminants from entering the cooling system and damaging the nightsight.

TA 159178

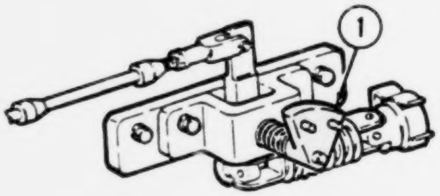
TURRET AND FIRE CONTROL EQUIPMENT

NOTE

Make sure you have the right nightsight. The one illustrated in this procedure only works on the M901 vehicle. On page 2-53 the M901A1 nightsight is illustrated. This installation procedure applies to both systems except where noted.

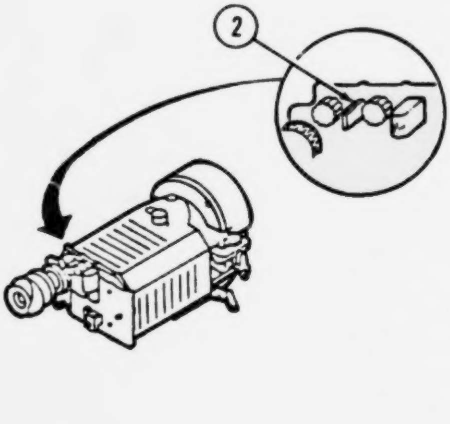
Check nightsight to make sure that the BRT and CTRS control actuator mounting block (2) and RANGE FOCUS knob are in place. If knobs are missing notify organizational maintenance.

1. Install daysight/tracker in accordance with procedure on page 2-135.
2. Push in spring-loaded, field-of-view (FOV) actuator (1) and rotate one quarter turn clockwise for clearance.



NOTE

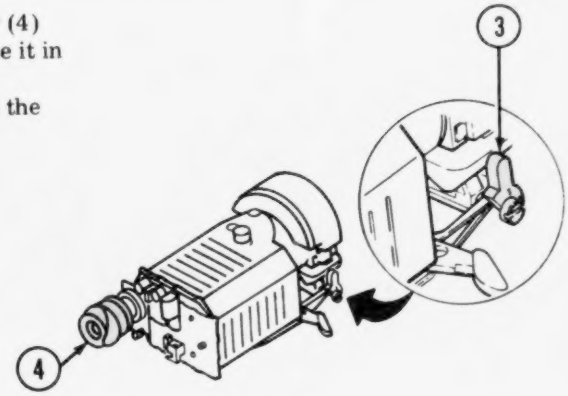
Push in near shaft to avoid binding.



TA 159179

3. Remove security shutter (4) from nightsight and place it in nightsight carrying case. Turn the diopter ring all the way in for clearance.

4. Set coarse azimuth control (3) to position No. 1 (handle points up).



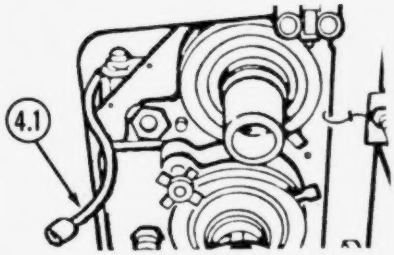
CAUTION

Do not let go of nightsight until securely mounted on daysight.

NOTE

After the vehicle power conditioner cable and boresight collimator cable have been connected to the M901A1 nightsight and the nightsight has been installed, cable connections become inaccessible and must remain connected until the nightsight is removed.

4.1 Connect vehicle power conditioner cable (4.1) to nightsight.

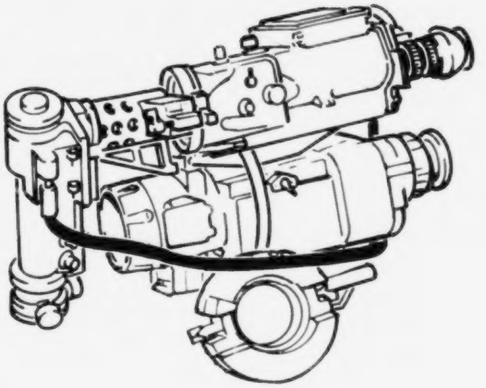


TA 159180

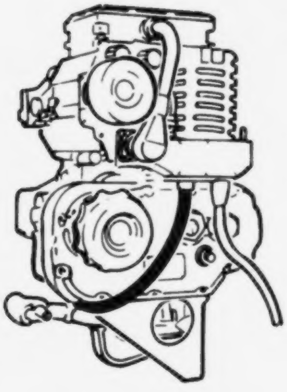
TURRET AND FIRE CONTROL EQUIPMENT

4.2 On the M901A1 vehicle, connect boresight collimator cable to nightsight and route as follows:

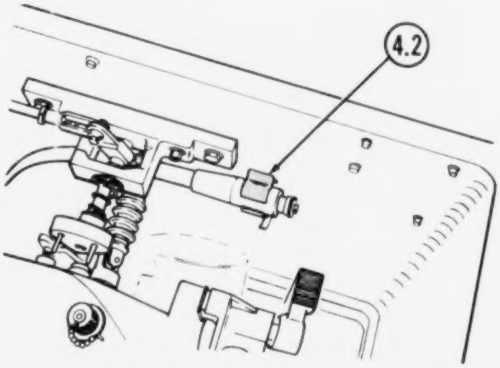
a. Bring the cable from underneath, across the front of the daysight/tracker to J4 on the nightsight.



b. Run the cable forward along the bottom, outside area of the daysight/tracker.

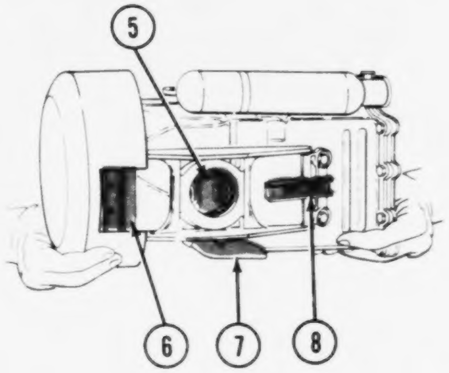


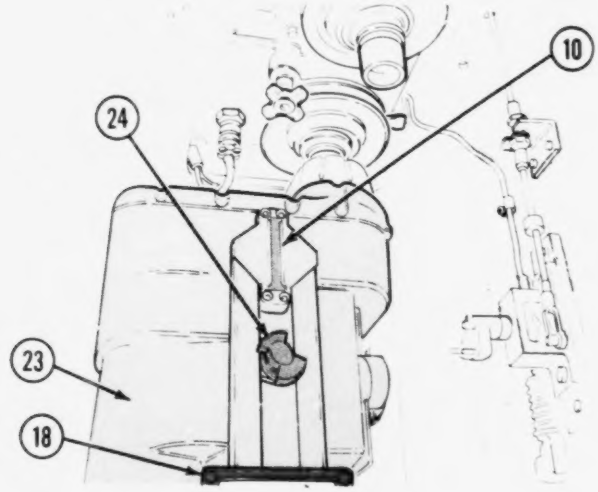
c. Cable will be stowed in the range focus actuator clip (4.2) when not in use.



TA 159181

5. Place the nighsight latching handle (7) to its rear position (toward the eyepiece), and mount the nightsight on top of the daysight/tracker (23). Make sure that the daysight/tracker cam post (24) lines up with the nightsight cam opening (5) and that V-ways (6) and (8) on the bottom of the nightsight line up with V-ways (18) and (10) on top of the daysight/tracker. It may be necessary to slightly rotate the nightsight to get a good fit.



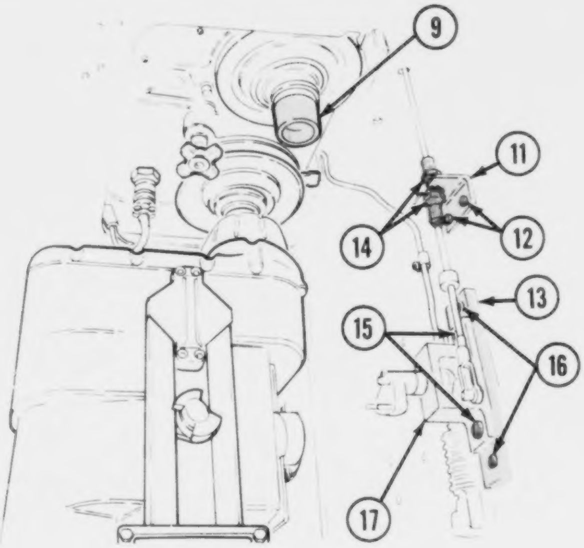


TA 159182

CAUTION

It is important that the nightsight NOT be used for leverage while locking the latching handle.

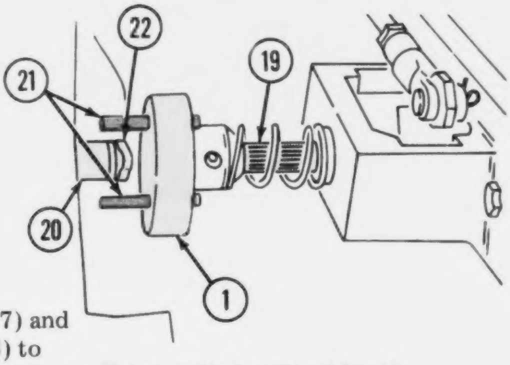
6. While holding the nightsight with the right hand, pull forward on latching handle until nightsight latch just engages. Then remove the right hand and pull latching handle all the way forward to lock sight in place. Turn the nightsight focusing ring to zero on top and make sure that the rubber adapter (9) alines with the eyepiece on the nightsight.



7. Aline the FOV actuator (1) with the FOV lever (22) as follows:

   (a) Loosen two bolts (16) and two bolts (15).

   (b) Position bracket (17) and mounting plate (13) to aline axis of FOV actuator adjusting shaft (19) with axis of FOV lever shaft (20) so that the axis of the shafts are within approximately 1/32-inch of alinement in any direction. Tighten two bolts (16) and two bolts (15).



TA 112629

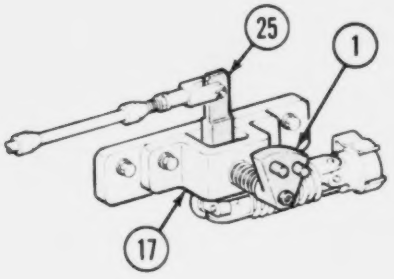
NOTE

Two men are required to accomplish steps (c) and (d): one in the gunner's station and one on the top deck of the vehicle.

(c) Operate the FOV selector a few times from the gunner's station while another man observes that arm (25) contacts one inside edge of bracket (17) at one extreme of travel and the other inside edge at the opposite extreme of travel.

(d) If arm (25) does not contact both inside edges of bracket (17) at extremes of travel, loosen two bolts (12) and move angle bracket (11) till arm (25) makes contact at each extreme of travel and then tighten two bolts (12). If this does not allow sufficient adjustment, adjust two nuts (14) till arm (25) contacts one inside edge of bracket (17) at each extreme of travel.

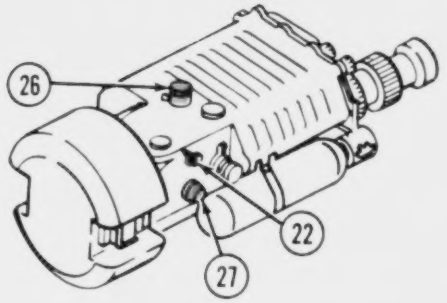
(e) Release FOV actuator (1) from its retracted position and engage with FOV lever (22) on the nightsight. When engaged, selector will be positioned between the two pins (21) of the actuator.



TA 112630

NOTE

The FOV lever (22) is internally spring loaded so it will snap over center position and will reach the end of its travel under its own power if it has been pushed to the snap-over point. When the RANGE FOCUS knob or the EL (boresight) knob is turned, the FOV lever will also move a small amount. The following procedures will ensure that the actuator pins (21) contact the nightsight FOV lever (22) only when they are pushing the lever to the snap-over point and that the actuator pins push the FOV lever at least to the snap-over point under all conditions.



NOTE

Nightsight shown is for M901 application. (See page 2-53 for nightsight used on M901A1.)

(f) Select NFOV by pulling the FOV selector in the gunner's station all the way out.

(g) Turn the RANGE FOCUS knob (27) all the way in one direction and note the direction that the FOV lever (22) moves.

(h) Turn the EL (boresight) knob (26) all the way in the direction that makes the FOV lever (22) move in the same direction as it did when the RANGE FOCUS knob (27) was turned.

TA 159183

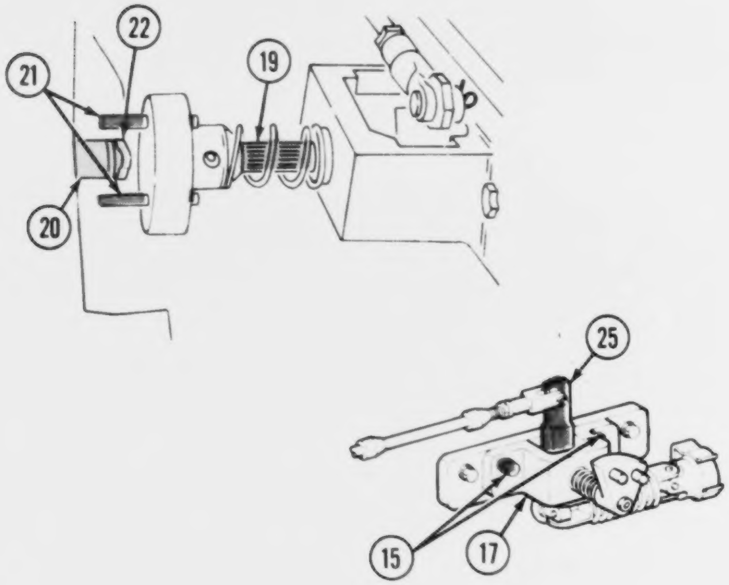
TURRET AND FIRE CONTROL EQUIPMENT

(i) Check that there is no contact between the FOV lever (22) and the actuator pins (21).

(j) Move arm (25) slowly from one end of its travel to the other; then move it slowly back to its original position. Check that the FOV lever (22) snaps over to the opposite position both times.

(k) If actuator pins (21) remain in contact with FOV lever (22) or if the FOV lever does not snap over center-position properly, loosen two bolts (15) and rotate bracket (17) around adjustment shaft (19) until the condition is eliminated.

(l) Turn the RANGE FOCUS knob (27) all the way in the opposite direction it was turned in step (g).



(m) Repeat steps (h) through (k).

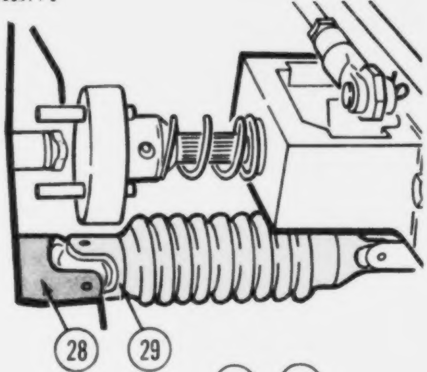
(n) If any adjustment is made repeat all tests beginning with step (g).

(o) Select WFOV from the gunner's station by pushing the FOV selector all the way in.

(p) Repeat steps (g) through (n).

TA 112632

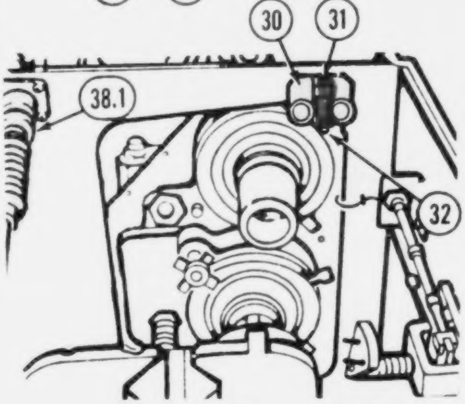
8. Remove range focus actuator (29) from stowage clip and connect to RANGE FOCUS knob on nightsight.



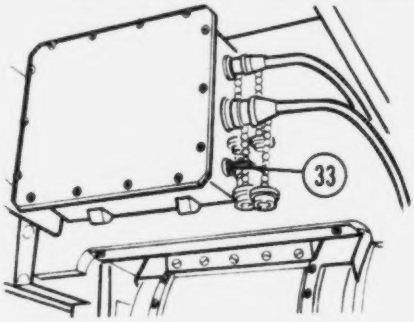
8.1 Place boresight collimator cable into storage clip.

> **NOTE**
>
> **Front U-joint of actuator (28) fits over RANGE FOCUS knob. It may be necessary to turn knob for proper fit.**

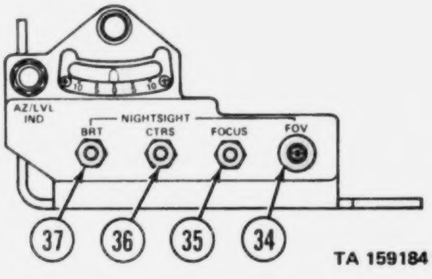
9. Remove nightsight CTRS and BRT control actuator assembly (30) from its stowage bracket (31) by depressing lock (32) on bottom of stowage bracket (31) and mount on nightsight holding block between the CTRS and BRT control knobs. Check it and make sure it seats properly.



10. Turn sight select switch to 3X or 13X. On M901A1, connect connector W13P1 (38.1) to nightsight. Check circuit breaker (33) on vehicle power conditioner to make sure it's in the ON position (pushed away from you).



11. Operate the CTRS (36), BRT (37), and range FOCUS (35) controls from inside gunner's station to see if they work. Recheck FOV control (34) for smoothness of travel.

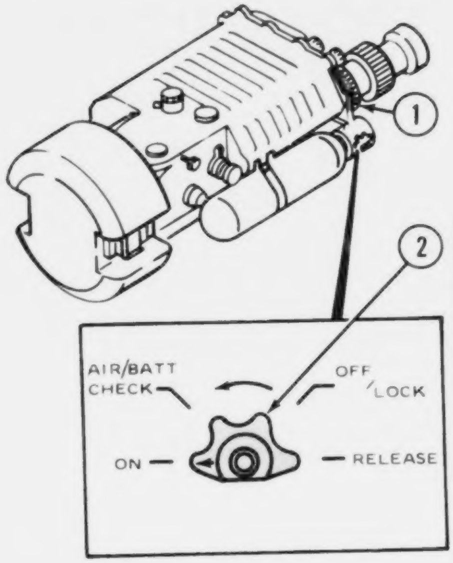


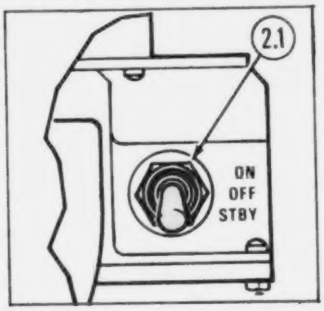
TA 159184

TURRET AND FIRE CONTROL EQUIPMENT

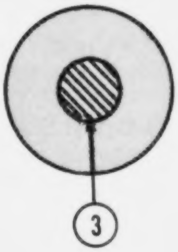
IMAGE TRANSFER ASSEMBLY (ITA) FOCUS AND ALINEMENT CHECK

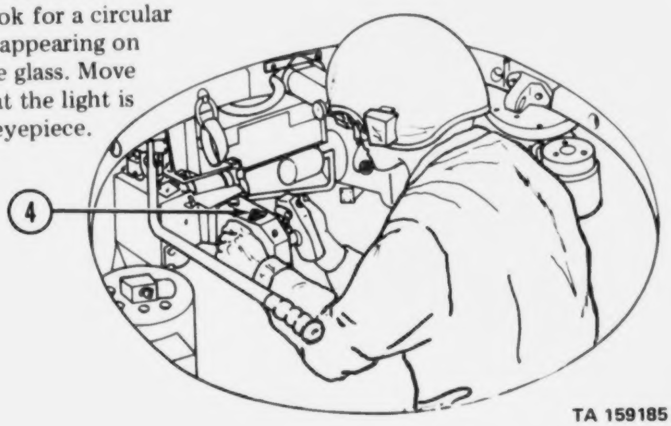
1. Install daysight/tracker and nightsight in accordance with procedures on pages 2-135 and 2-137, respectively.
2. Set the focusing ring on the daysight/tracker to zero. (Zero points up.)
3. Turn the nightsight focusing ring (1) to zero and turn on either the nightsight actuator switch (2) on the M901 or the ON/OFF/STBY switch (2.1) on the M901A1. Close sight access cover.



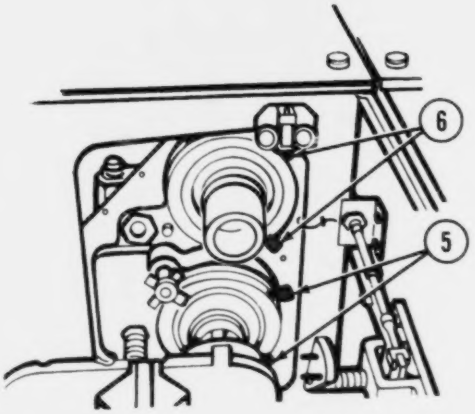


4. Turn the sight select switch (4) to 13X and adjust the ITA focusing ring to get a sharp image of the daysight/tracker reticle. Sight through the ITA eyepiece from a distance of about 6 to 12 inches and look for a circular spot of light (3) appearing on the ITA eyepiece glass. Move your head so that the light is centered in the eyepiece.





TA 159185



5. If the spot is not perfectly circular, have someone else move the alinement tabs (5) on the daysight/tracker objective lens of the ITA one at a time while noting whether this helps or hurts the circular shape. Have the alinement tabs moved in the direction to "help" until the spot of light is perfectly circular.

6. Turn the sight select switch to NIGHT and repeat step 5, adjusting as necessary the alinement tabs (6) on the nightsight channel objective lens.

7. Check the focus adjustment of the 13X and 3X channels by switching the sight select switch back and forth from 13X to 3X, noting that, without ever having had to touch ITA eyepiece focusing ring, each reticle appears sharp. Call organizational maintenance if ITA focusing ring must be turned to achieve sharp focus.

8. **On M901 nightsight, turn the nightsight actuator switch to OFF/LOCK until ready to use the nightsight.**

9. **On M901A1 nightsight, turn the ON/OFF/STBY switch to STBY until ready to use the nightsight.**

TA 159186

TURRET AND FIRE CONTROL EQUIPMENT

REMOVAL AND STORAGE OF NIGHTSIGHT

1. Open sight access cover.
2. On M901, turn nightsight actuator switch to the OFF/LOCK position. On M901A1, turn nightsight ON/OFF/STBY switch to OFF. Install nightsight lens protector (2) if not installed.

CAUTION

On M901, a coolant cartridge (full or empty) and battery must be installed on the nightsight at all times except when exchanging cartridges or batteries. This prevents contaminants from entering the cooling system and damaging the nightsight.

3. Disconnect post amplifier (PA) cables from nightsight and stow on receptacle.
4. Remove BRT and CTRS control actuator by depressing the button on top of the control actuator and place on stowage bracket.

4.1 Remove boresight collimator cable.

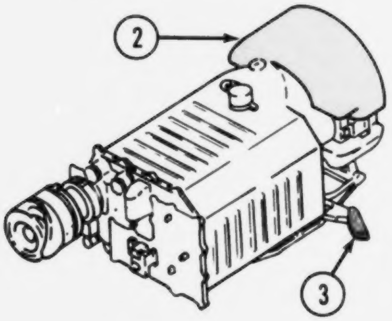
5. Remove focus control actuator and stow it.
6. Retract the FOV actuator. Push in line with actuator shaft and when fully retracted, turn 1/4 turn to hold in retracted position.
7. Turn focusing ring all the way in for clearance.

CAUTION

Do not lift nightsight by PA cable.

8. Grasp nightsight firmly with one hand while pushing latching handle (3) back toward the eyepiece.

8.1 Disconnect vehicle power conditioner cable and boresight collimator cable.



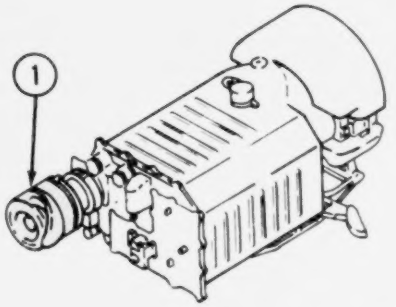
NOTE

Nightsight shown is used on M901 vehicle only. However, this procedure works for M901 as well as for M901A1 vehicle application.

TA 159187

TURRET AND FIRE CONTROL EQUIPMENT

REMOVAL AND STORAGE OF NIGHTSIGHT



CAUTION

Nightsight is a delicate optical instrument; treat it carefully.

9. Carefully lift nightsight out of the launcher and close sight access cover.

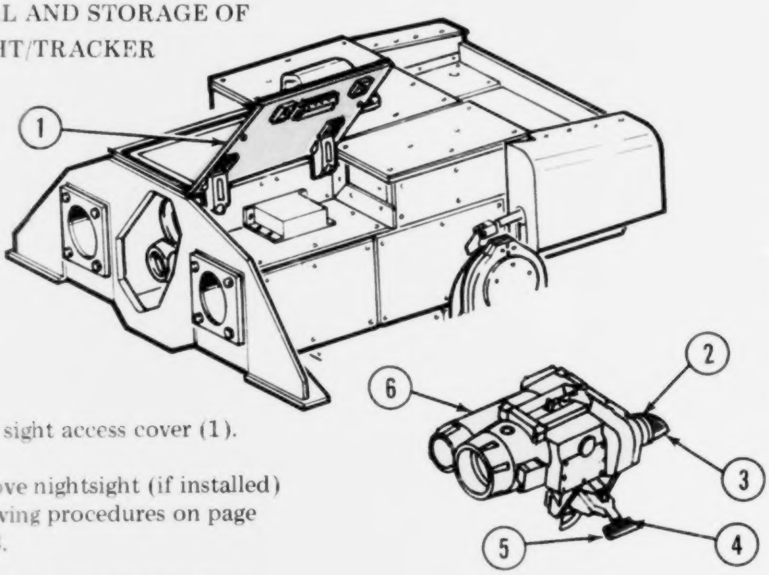
9.1 Stow boresight collimator cable in nightsight case.

10. Replace security shutter (1). Remove battery (if installed) on M901.

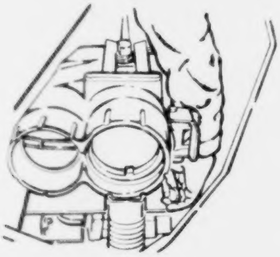
11. Stow nightsight in assigned location unless it is to be used in dismounted mode.

TA 159188

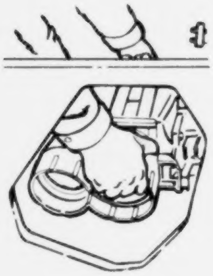
REMOVAL AND STORAGE OF DAYSIGHT/TRACKER



1. Open sight access cover (1).
2. Remove nightsight (if installed) following procedures on page 2-143.
3. Turn the focusing ring (2) all the way in for clearance.



4. While holding sight (6) in position with left hand, reach down over sight and squeeze detent (4) on latching handle (5), and lower to the down position.



5. Hold the daysight/tracker with two hands and remove it.
6. Replace eyecup (3) and stow the daysight/tracker in the assigned location unless it is to be used in the dismounted mode.

TA 070905

TURRET AND FIRE CONTROL EQUIPMENT

INSTALLATION OF MISSILE GUIDANCE SET (MGS)

If missile guidance set is not installed, proceed as follows:

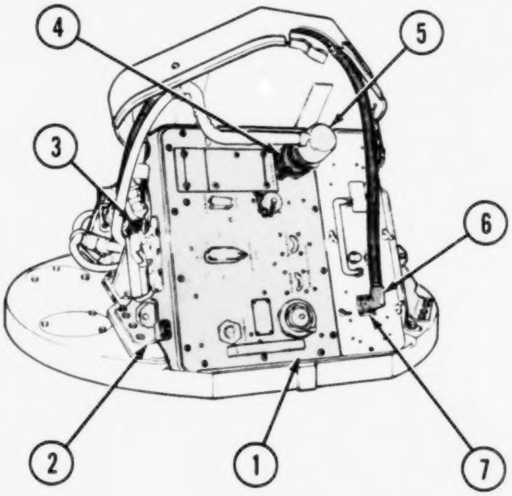
NOTE

The MGS shown in this procedure is the one that goes with the M901 system and will not work on the M901A1 system. This installation procedure applies to both systems. (See page 2-50.2 for illustration of MGS used on M901A1.)

1. Remove cover from missile guidance set.
2. Set missile guidance set (1) in the box assembly (2).
3. Connect cable connector (5) to connector J1 (4) on missile guidance set.

NOTE

If MGS battery is installed in MGS, remove battery in accordance with procedures on page 3-59 and store in spare MGS battery box located on left sponson.



4. Install TVPC in accordance with procedures on page 2-144.2.

REMOVAL OF MGS

1. Disconnect cable connector (5) from connector J1 (4) on missile guidance set (1).
2. Disconnect cable connector (6) from connector J1 (7) on TVPC.
3. Remove holddown straps (3).
4. Remove missile guidance set (1) from box assembly (2) and replace missile guidance set cover.

TA 159189

TURRET AND FIRE CONTROL EQUIPMENT

INSTALLATION OF TOW VEHICLE POWER CONDITIONER (TVPC)

1. Unlatch strap (9) on each side of MGS (6) and raise cover (11).

2. Insert TVPC (1) into MGS (6). Secure with 6 winged fasteners (2).

3. Remove cable (13) from storage strap (12) and connect cable to connector J1 (5) on TVPC. Make sure other end of cable (13) is connected to MGS.

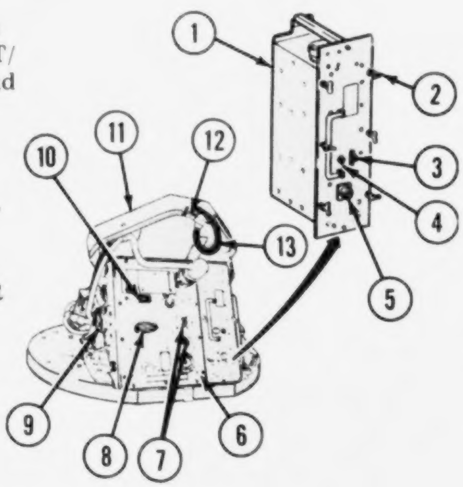
4. Close cover (11) and latch 2 straps (9).

5. Set TVPC power switch (3) to ON and observe that power lamp (4) lights.

6. On M901 system, check TVPC as follows:

   a. Set SELF TEST SWITCH (8) on MGS to position 1, lift the TEST/OPERATE switch cover (10), and hold the spring-loaded TEST/OPERATE switch to TEST.

   b. Look for an in-band reading of both the ELEVATION and AZIMUTH SELF TEST METERS (7). If meters read out of band, check BATTERY GENERATOR indicator on driver's control panel for proper voltage of vehicle batteries. If BATTERY GENERATOR indicator shows proper voltage, replace TVPC (1). If trouble persists, replace MGS (6).



7. On M901A1 system, check TVPC by performing steps 14 and 15 a thru c of MGS system checkout on page 2-156.6 and 2-156.7.

REMOVAL OF TVPC

1. Set TVPC power switch (3) to OFF.

2. Unlatch 2 straps (9) and raise cover (11).

3. Disconnect cable (13) from connector J1 (5).

4. Coil cable (13) and secure to bottom of cover (11) using strap (12).

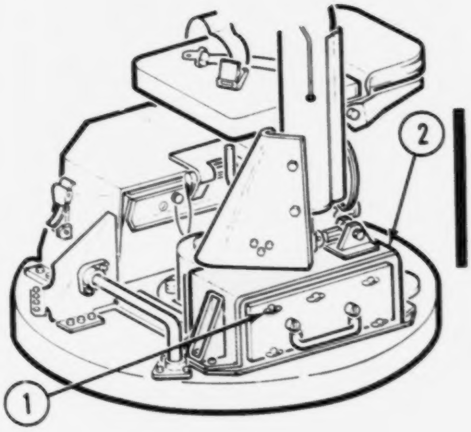
5. Loosen 6 winged fasteners (2) and remove TVPC (1).

TA 159190

INSTALLATION OF EMERGENCY POWER (EMER PWR) BATTERY

1. Slide battery assembly into battery box (2) applying pressure to overcome spring tension until face of battery assembly is flush with face of battery box.

2. While holding in position, secure with winged fasteners (1).



REMOVAL OF EMER PWR BATTERY

1. Loosen winged fasteners (1).

2. Carefully pull battery out of battery box (2). Store in a secure and dry place.

TA 157900

TURRET AND FIRE CONTROL EQUIPMENT

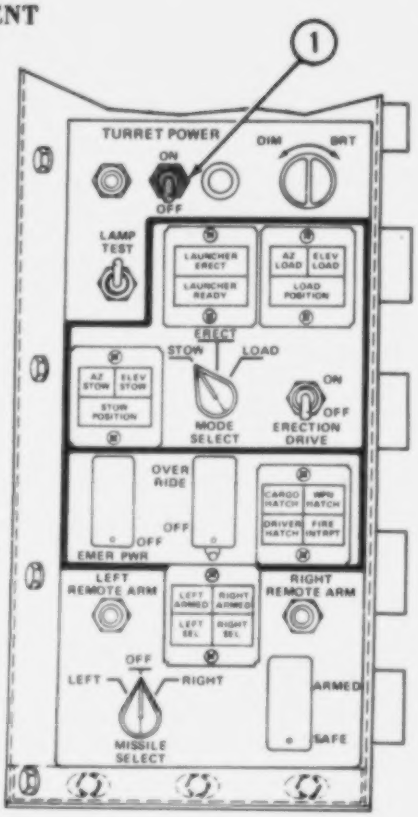
ERECTION OF LAUNCHER FROM STOWED POSITION

WARNING

To avoid injury to personnel and damage to equipment make sure hull deck is clear of personnel, loose objects, and other obstructions prior to erecting launcher.

CAUTION

To avoid damaging the erection drive gear shaft teeth and bearings due to improper alinement, do not operate the erection drive with the left erection arm cover removed.


1
TURRET POWER
ON
OFF
DIM
BRT
LAMP TEST
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
ERECT
STOW
LOAD
AZ STOW
ELEV STOW
STOW POSITION
MODE SELECT
ON
OFF
ERECTION DRIVE
OVER RIDE
OFF
OFF
EMER PWR
CARGO HATCH
MPU HATCH
DRIVER HATCH
FIRE INTRPT
LEFT REMOTE ARM
LEFT ARMED
RIGHT ARMED
LEFT SEL
RIGHT SEL
RIGHT REMOTE ARM
OFF
LEFT
RIGHT
MISSILE SELECT
ARMED
SAFE

1. Lock machinegun and pintle mount in the stow position.
2. Close all hatches.
3. Make sure that the TURRET POWER switch (1) is OFF.
4. Turn vehicle MASTER SWITCH to ON.
5. Start engine (see note).

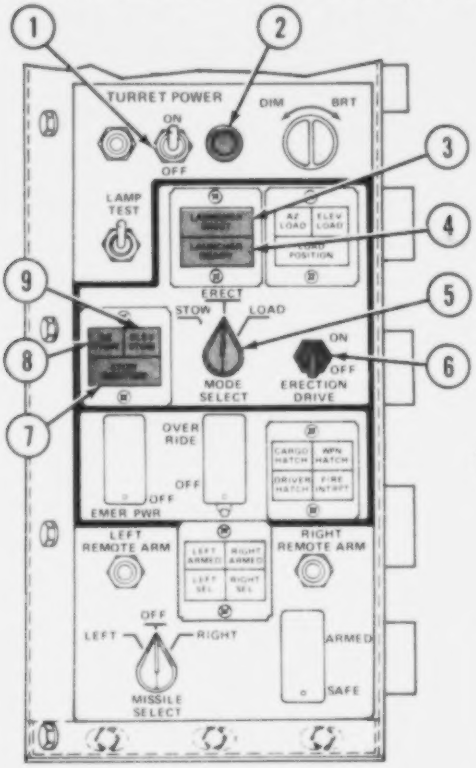
NOTE

The launcher can be erected using battery power, but it is best to start the engine to avoid draining the batteries.

6. Turn the TURRET POWER switch (1) to ON.

TA 158946

TURRET AND FIRE CONTROL EQUIPMENT


1
2
3
4
5
6
7
8
9
TURRET POWER
ON
OFF
DIM
BRT
LAMP TEST
AZ LOAD
ELEV LOAD
LOAD POSITION
ERECT
STOW
LOAD
MODE SELECT
ON
OFF
ERECTION DRIVE
OVER RIDE
OFF
OFF
EMER PWR
CARGO HATCH
WPN HATCH
DRIVER HATCH
FIRE INTRPT
LEFT REMOTE ARM
RIGHT REMOTE ARM
LEFT ARMED
RIGHT ARMED
LEFT SEL
RIGHT SEL
OFF
LEFT
RIGHT
MISSILE SELECT
ARMED
SAFE

7. Look for the TURRET POWER lamp (2) to come on. The AZ STOW (8), ELEV STOW (9), and STOW POSITION (7) lights will be lit. No other lights should be on.

8. Turn MODE SELECT switch (5) to ERECT.

9. Push up on ERECTION DRIVE switch (6) and hold in ON position.

10. Look for LAUNCHER ERECT (3) and LAUNCHER READY (4) lamps to light when launcher is completely erected and locked in the erect position.

WARNING

Do not operate gunner's hand controls unless both the LAUNCHER ERECT and LAUNCHER READY indicators on gunner's control panel are lit. Failure to observe this warning may cause launcher to fall resulting in serious injury to personnel and damage to equipment.

NOTE

STOW POSITION light will go out but AZ STOW and ELEV STOW lights will stay on.

11. Release ERECTION DRIVE switch.

CAUTION

Do not turn off turret power with launcher erected unless hydraulic pressure is released. See page 2-134 for bleed-down procedure.

TA 112636

NOTE

The system checkout procedures must be performed at the beginning of each operating day. When the tactical situation permits, the system checkout procedures will be performed as follows:

Collimation must be performed whenever boresight is adjusted, in accordance with procedures on page 2-152.1.

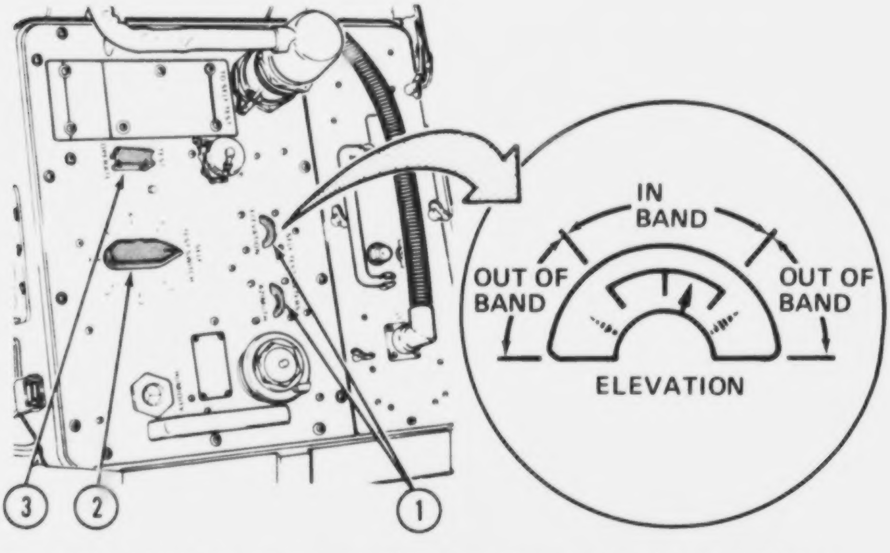
At 4-hour intervals during the operating day.

After a temperature change of ±10°F.

After a change of operating site of 50 meters or more.

After replacement of any system component.

MISSLE GUIDANCE SET SELF TEST (M901)



The MGS self test checks the operational readiness of the MGS, including the TVPC (or the MGS battery), the daysight/tracker, the elevation and azimuth tachometers, and the interconnecting cables. In addition, step 9 of this procedure should be checked every 4 hours or when there has been a 10 degree temperature change. If readings of both meters (1) are in-band, boresight alinement is in tolerance, and readjustment of the daysight boresight knobs (step 9) and recollimating and boresighting the nightsight is not necessary. If reading of either meter (1) is out-of-band, step 9 has to be performed as well as the nightsight checks and boresight alinement. This procedure can be used for the M901 vehicle as well as for the dismounted TOW system.

TA 159204

TURRET AND FIRE CONTROL EQUIPMENT

1. Set SELF TEST SWITCH (2) to position 1, lift the TEST/OPERATE switch cover (3), and hold spring-loaded TEST/OPERATE switch to TEST.

   Look for an in-band reading of both the ELEVATION and AZIMUTH SELF TEST METERS (1). (Meters should be lit.) Replace the TVPC (or the MGS battery) if meter(s) read out of band and repeat test. If trouble persists, replace MGS.

WARNING

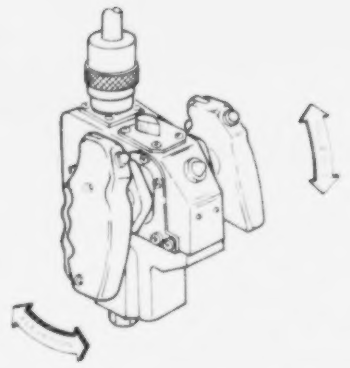
If launcher is loaded with live missile(s), make sure that the SAFE/ARMED switch on the gunner's control panel is in the SAFE position on vehicular system. Place the arming lever to SAFE on ground-emplaced system. For added safety, perform checkout procedures without live missiles.

2. Turn SELF TEST SWITCH to position 2 and hold the TEST/OPERATE switch to TEST. Replace MGS if SELF TEST METERS read out of band.

TA 157902

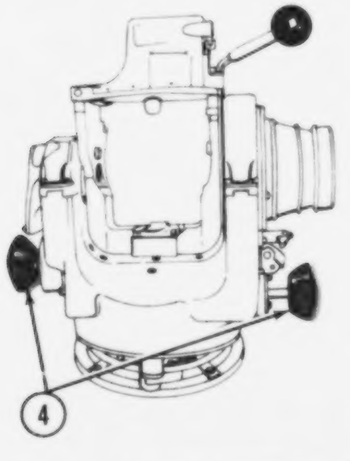
TURRET AND FIRE CONTROL EQUIPMENT

3. On the vehicle-mounted system, use hand controls to first elevate, then depress the launcher while holding the TEST/OPERATE switch in TEST position. Observe the ELEVATION meter. The needle should deflect first right, then left. If test fails, replace MGS. If trouble persists, notify organizational maintenance to troubleshoot the elevation tachometer and associated wiring.



On the ground-emplaced TOW system, use control knobs (4) to first elevate, then depress the launch tube while holding the TEST/OPERATE switch in TEST position. Observe the ELEVATION meter. The needle should deflect first right, then left. If test fails, replace traversing unit. If trouble persists, replace MGS.

4. On the vehicle-mounted system, use the hand controls to turn the turret first left, then right, while holding the TEST/OPERATE switch to TEST. The AZIMUTH meter should deflect left for left rotation of the turret and right for right rotation. If the test fails, replace MGS. If trouble persists, notify organizational maintenance to troubleshoot the azimuth tachometer and associated wiring.



On the ground-emplaced TOW system, use the control knobs (4) to turn the launch tube first left, then right, while holding the TEST/OPERATE switch in TEST position. The AZIMUTH meter should deflect left for left rotation of the launch tube and right for right rotation. If test fails, replace traversing unit. If trouble persists, replace MGS.

5. Set the MGS SELF TEST SWITCH to position 3 and hold TEST/OPERATE switch to OPERATE. Replace MGS if meter reads out-of-band.

6. Set MGS SELF TEST SWITCH to position 4 and place the TEST/OPERATE switch to TEST. Replace MGS if meter reads out-of-band.

TA 157903

NOTE

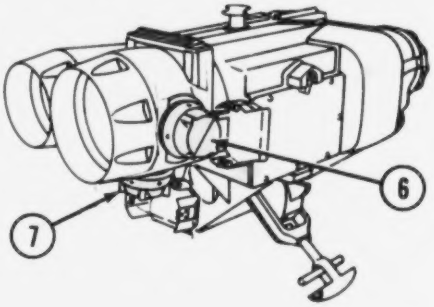
Read the following step carefully before proceeding.

7. Hold the TEST/OPERATE switch to TEST while setting MGS SELF TEST SWITCH to position 5. For proper operation, the AZIMUTH meter should deflect to the extreme left for about 8 to 12 seconds after setting the SELF TEST SWITCH to position 5; then meter should read in the acceptable band. The ELEVATION meter should go through the following cycles: extreme left to in-band, back to extreme left, and then back to in-band where it should remain. If the meter does not settle down to in-band in 12 seconds, replace MGS.

8. Set SELF TEST SWITCH to position 6 and hold the TEST/OPERATE switch to TEST. Replace MGS if either ELEVATION or AZIMUTH meter is out-of-band.

8.1 Set diopter ring on daysight/tracker to +3 or greater.

9. Turn the SELF TEST SWITCH to position 7 and hold the TEST/OPERATE switch to TEST. Check for a center-band reading on both test meters. Adjust azimuth (6) and elevation (7) boresight knobs as necessary.



NOTE

When performing step 9 after 4 hours of operation or a 10 degree temperature change, if the test meters read in-band, adjustment of the boresight knobs should not be accomplished until one or both test meters read out-of-band.

Slight oscillation of the meter (two needles width) around the in-band area is normal for step 9 (SELF TEST switch in position 7). However, direct sunlight may cause meters to oscillate more; shade lenses if necessary to get a steady reading. If still unable to get a steady reading, notify organizational maintenance.

Some interaction will occur in making the adjustment, i.e., when turning the elevation knob, the AZIMUTH meter will move and vice versa. This is especially true when the adjustment knobs are near the end of their travel.

TA 158948

NOTE

If correct alinement cannot be readily obtained, release TEST/ OPERATE switch, preset knobs (6) and (7) to their center position, and repeat adjustment procedure.

If the nightsight is being used, perform nightsight boresight procedures (page 2-154) after boresighting of daysight/tracker.

If unable to adjust for a center-band reading take corrective action as follows:

a. If daysight/tracker motor does not run (it can be heard if it runs), replace the daysight/tracker and repeat test. Replace MGS if test still fails.

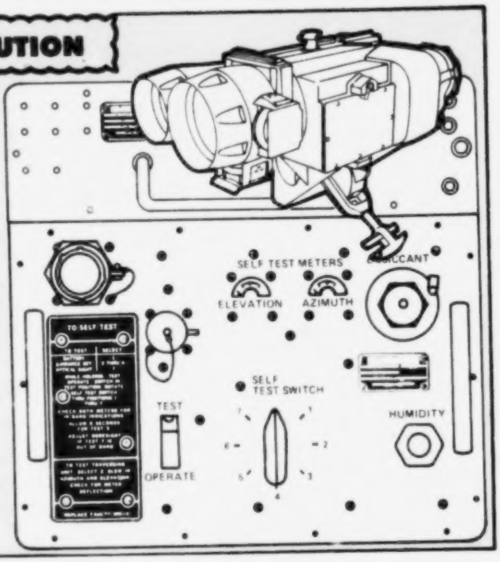
b. If tracker motor does run, replace the MGS and repeat the test.

c. Call organizational maintenance if neither a or b has corrected the problem.

TA 158949

CAUTION

If daysight/tracker and MGS had to be replaced in step a above, and if the MGS corrected the problem, do not assume that the first daysight/tracker is good and reuse it. The daysight/tracker may have been the cause of the failure of the MGS and if used could damage the new MGS. Turn it in to maintenance for checkout and repair as necessary.


SELF TEST METERS
DESICCANT
ELEVATION
AZIMUTH
TO SELF TEST
SELF TEST SWITCH
TEST
OPERATE
HUMIDITY
1
2
3
4
5
6
7

10. On ground-emplaced system focus the eyepiece as necessary. Turn reticle light off to conserve battery power when finished.

11. Repeat steps 1 and 2 and return SELF TEST SWITCH to unmarked position.

WARNING

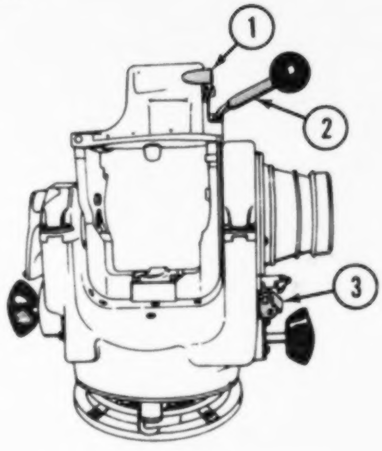
Make double sure there is no missile in the launch tube prior to performing the next step.

NOTE

Step 11 above marks the end of the procedure for the M901 mounted system. The rest is for ground-emplaced system only.

TA 070912

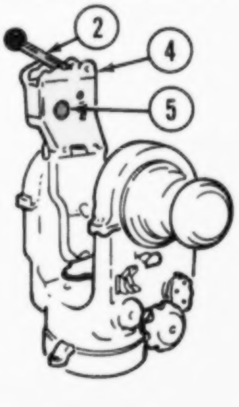
12. Lift trigger protective cover (3) and check the mechanical operation of the trigger by pressing and releasing the trigger. The trigger is good if it springs back. Lower the protective cover.



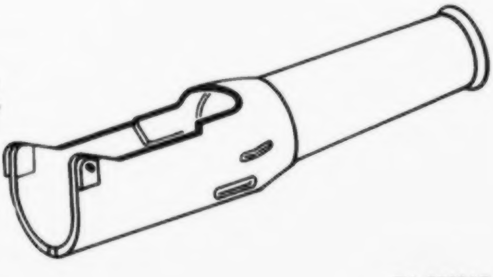
CAUTION

Do not try to raise the arming lever (1) when the bridge clamp locking handle (2) is in the unlocked position; it will damage the arming mechanism and keep the electrical connector from retracting all the way.

13. Raise bridge clamp (4) and check electrical connector (5) for dirt and other foreign material. Make sure connector goes to the retract position when arming lever is lowered. Check operation of the wire cutter switch. A click should be heard as the locking handle is slowly raised to the unlocked position, and again as the handle is lowered to the locked position.



14. Check launch tube to make sure it is properly alined and securely attached to traversing unit. Check breech and bore. Make sure they are free of dirt and other foreign matter.



TA 070913

NOTE

The system checkout procedures must be performed at the beginning of each operating day. When the tactical situation permits, the system checkout procedures will be performed as follows:

Collimation must be performed whenever boresight is adjusted.

At 4-hour intervals during the operating day.

After a temperature change of ±10°F.

After a change of operating site of 50 meters or more.

Replacement of any system component.

NIGHTSIGHT CHECK AND BORESIGHT ALINEMENT (M901)

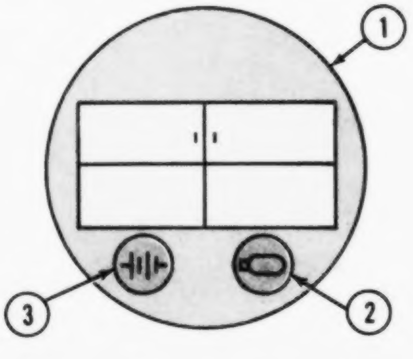
CAUTION

A coolant cartridge (full or empty) and battery must be installed on the nightsight at all times except when exchanging cartridges or batteries. This prevents contaminants from entering the cooling system and damaging the nightsight.

NOTE

The nightsight must be boresighted whenever the daysight/tracker is boresighted (See page 2-150).

1. Install nightsight in accordance with procedure on page 2-136.1 or 2-181 as appropriate. Erect turret if system is vehicle mounted and turn sight switch to NIGHT.
2. Set actuator on nightsight to AIR/BATT CHECK, and look into the ITA eyepiece if vehicle-mounted, or nightsight eyepiece if ground-emplaced. Adjust BRT (brightness) and CTRS (contrast) controls to get a good reticle image. Sight picture should be as shown. The rectangular area (1) should be lit. The coolant cartridge monitor (2) and the battery monitor (3) should not be lit.



3. On vehicle-mounted system adjust ITA focusing ring. On ground-emplaced system adjust eyepiece focusing ring of nightsight for best possible focus of reticle.

TA 159193

4. Remove front lens protector of nightsight and set nightsight actuator to ON. Allow 15 seconds for cooldown of nightsight. (Allow more time for less than fully charged coolant cartridge.)

CAUTION

Never hold nightsight pressure relief valve closed. This could damage the nightsight.

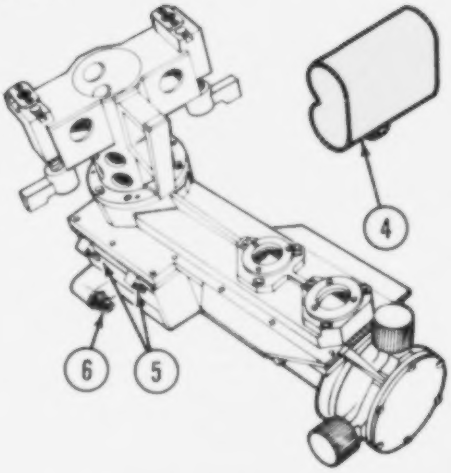
5. Select narrow field-of-view (NFOV). (FOV selector on vehicle-mounted system is all the way out.) Select a target and adjust BRT, CTRS, and FOCUS controls for best display of image. Select wide field-of-view (WFOV). (FOV selector on vehicle-mounted system is all the way in.) Focus should not change when switching from NFOV to WFOV.

6. Return to NFOV.

TA 157907

WARNING

Boresight procedure which starts with step 9 should be performed without an encased missile in the launcher. If an encased missile is in launcher, make certain the arming lever in ground system is lowered to SAFE and no missile is selected and/or armed on vehicle system.



NOTE

Boresighting of daysight/tracker (step 9 of MGS self test, page 2-150) must be completed prior to boresighting the nightsight.

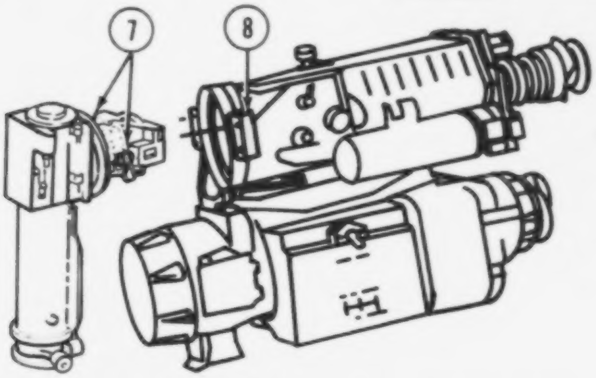
CAUTION

The collimator is a precision instrument. Handle it with care.

CAUTION

Once the collimator is secured to the nightsight, do not touch it except at its AZ and EL knobs to assure accuracy of alinement.

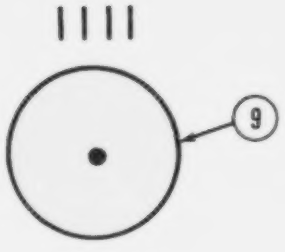
7. Remove boresight collimator from field carrying case.
8. Install battery (4) on boresight collimator at guide pins (5). Push in to mate with battery connector (6).



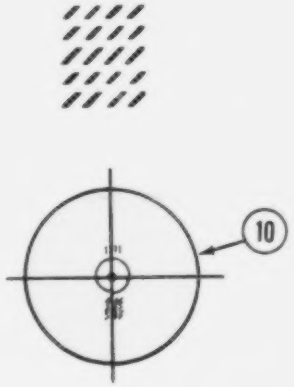
9. Place locking handles (7) of boresight collimator to the up position, and position boresight collimator over locating pins and pads (8) on front of nightsight. Secure collimator to nightsight by pushing in on locking handles and turning them all the way down.

TA 070915

10. On vehicle-mounted system, set the sight select switch to 13X, and sight through the ITA eyepiece or through the daysight/tracker in ground-emplaced system. Look for sight picture (9).



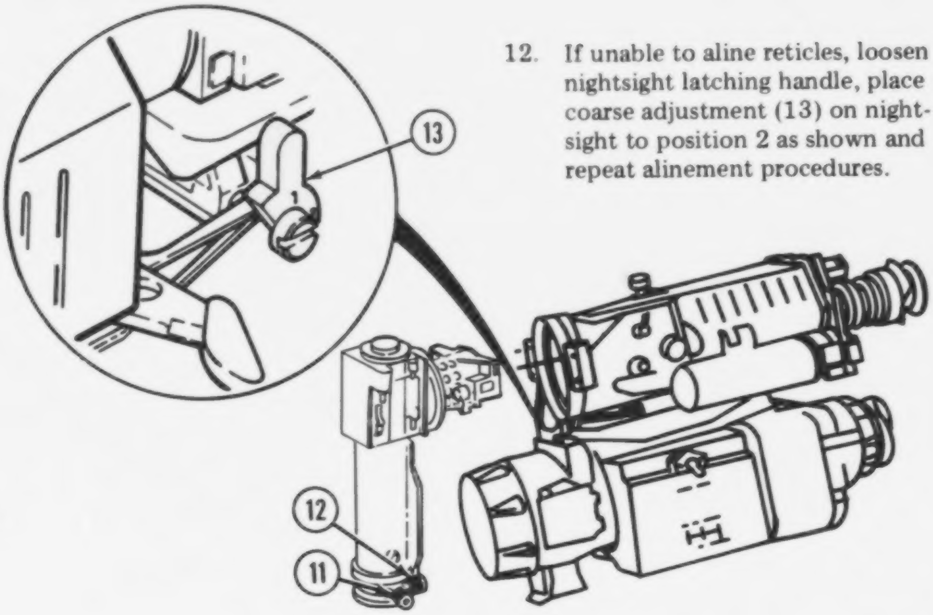
11. Adjust boresight collimator EL (12) and AZ (11) adjustment knobs to bring reticle into perfect alinement with the daysight/tracker reticle sight picture (10).



NOTE

It may be necessary to turn on reticle light on daysight/tracker in ground mode to get a clear reticle.

12. If unable to aline reticles, loosen nightsight latching handle, place coarse adjustment (13) on nightsight to position 2 as shown and repeat alinement procedures.

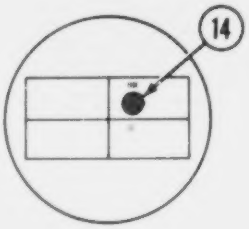


TA 070916

13. Sight through nightsight or ITA eyepiece and look for collimator reticle (14), adjusting nightsight controls as necessary to obtain best display of reticle.

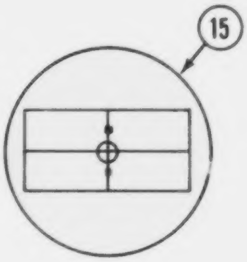
NOTE

Collimator reticle may be anywhere within retangular reticle of nightsight or may be completely out of sight picture if alinement is off.



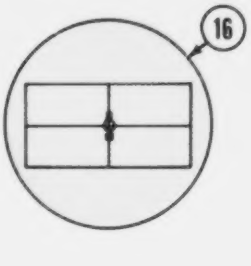
14. Unlock EL and AZ (boresight) knobs on nightsight.

15. Adjust nightsight AZ and EL boresight adjustment knobs to bring reticles into alinement (sight picture 15).



16. Lock boresight adjustment knobs on nightsight and recheck sight picture.

17. Push FOV selector in gunner's station all the way in to select wide field-of-view and adjust BRT and CTRS controls for best viewing of collimator reticle. Size of reticle should be reduced but should remain in close alinement (sight picture 16). Repeat nightsight installation, page 2-137, and nightsight check and boresight procedure if alinement is off. Replace nightsight if unable to maintain alinement.



18. Return to 13X and recheck daysight/tracker - calling for reticle alinement (sight picture 10).

TA 070917

19. Grasp boresight collimator firmly, release securing latches, and remove boresight collimator from nightsight. Remove battery from boresight collimator, and place battery in battery case. Replace collimator in field carrying case.

NOTE

Coolant cartridge and battery monitors may light during nightsight use. This indicates that cartridge and battery are down to less than 10 minutes of continuous operation and should be replaced at the earliest opportunity.

20. Recheck nightsight coolant cartridge by sighting through nightsight or ITA eyepiece. If coolant cartridge monitor light is on, replace discharged coolant cartridge by rotating actuator switch to RELEASE and removing cartridge. Place empty cartridge (inverted to show it is empty) in case, to be refilled later. Insert a full cartridge through cartridge retainer clip and into the actuator assembly. Set actuator switch to OFF/LOCK if sight is not to be used immediately.

TA 159191

MISSILE GUIDANCE SET (MGS) SELF-TEST AND TOW WEAPON SYSTEM CHECKOUT (M901A1)

WARNING

If launcher is loaded with live missile(s) make sure that the SAFE/ARMED switch on the gunner's control panel is in the SAFE position on vehicular system. Place the arming lever to SAFE on ground-emplaced system. For added safety, perform checkout procedures without live missiles.

The MGS self-test and TOW weapon system checkout procedure is used to check the operational readiness of the MGS, including the TOW vehicle power conditioner (TVPC) or MGS battery, the daysight/tracker, nightsight, TOW traversing unit and launch tube. This procedure can be used for the M901A1 vehicle as well as for the ground TOW system. To perform the MGS self-test/system checkout, proceed as follows:

CAUTION

Do system checkout procedure as quickly as possible. If too much time is taken to do system checkout procedure, battery assembly, if used, will not have enough power to fire missiles.

Do not operate NIGHTSIGHT range FOCUS control from gunner's station unless nightsight is installed; damage to equipment may occur.

NOTE

The MGS self-test/TOW weapon system checkout must be performed for any of the following reasons:

Collimation must be performed whenever boresight is adjusted (steps 25 through 40).

At the beginning of each operating day.

After a change of operating site of 50 meters or more.

After assembly of TOW system for ground mode operation.

After installation of daysight/tracker, nightsight, and MGS on vehicle for vehicle operation.

Every 4 hours (steps 12 through 15 only).

After a temperature change of ±10°F (steps 12 through 15 only).

If, in the performance of the test/checkout procedure a component is replaced, repeat test starting with step 1.

TA 159192

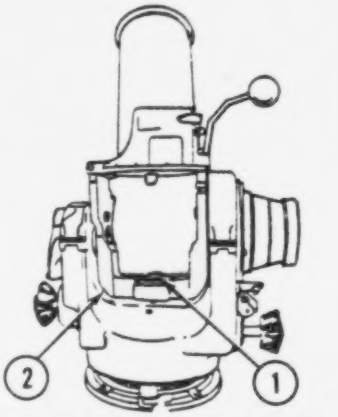
TURRET AND FIRE CONTROL EQUIPMENT

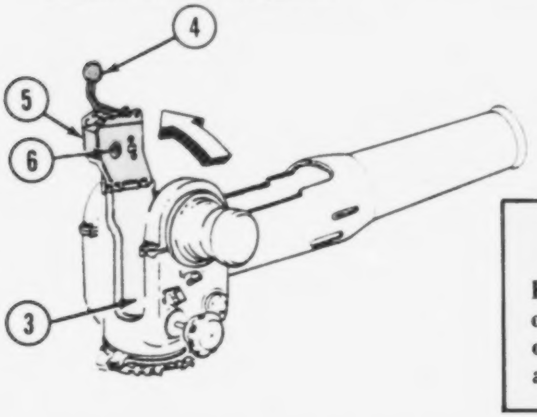
NOTE

Steps 1 through 7 are for ground TOW system only. Proceed to step 8 if checking vehicle system.

To check ground TOW system, assemble TOW launcher and ensure launcher is level.

1. On ground system, make sure launch tube latch (1) is securely attached to trunnion (2) of traversing unit. Replace launch tube if not secure.
2. On traversing unit, check breech (3), and inside of launch tube for dirt and other foreign matter. Clean as required.





CAUTION

Keep post amplifier cable clear of bridge clamp. Bridge clamp can damage post amplifier cable.

3. Raise bridge clamp locking handle (4) and open bridge clamp (5). Replace traversing unit if bridge clamp fails to unlock and open without binding.
4. Check umbilical connector (6) on traversing unit for dirt and other foreign matter. Clean as required. Also check that connector is completely retracted. Replace traversing unit if connector is not retracted.
5. Lower bridge clamp (5) and lower bridge clamp locking handle (4) fully. Then raise bridge clamp locking handle slowly. A clicking sound should be heard. Replace traversing unit if clicking sound cannot be heard.
6. Lower bridge clamp locking handle slowly and listen for a click. Replace traversing unit if no click is heard.
7. On traversing unit, raise arming lever. Check that umbilical connector (6) extends about one inch.

TA 159194

CAUTION

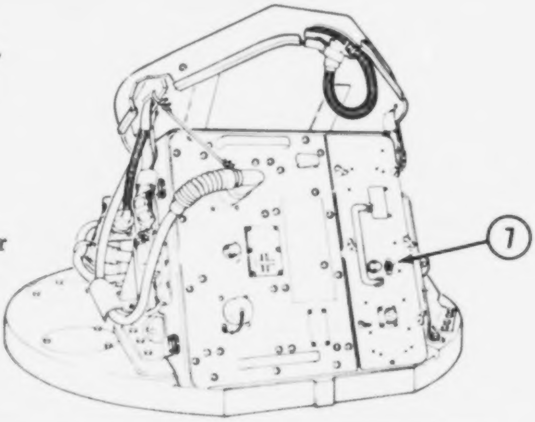
Do not lift nightsight by PA cable.

NOTE

Nightsight must be installed before system can be determined ready.

If TEST/OPERATE switch is released during self-test, allow at least 3 seconds before restarting test.

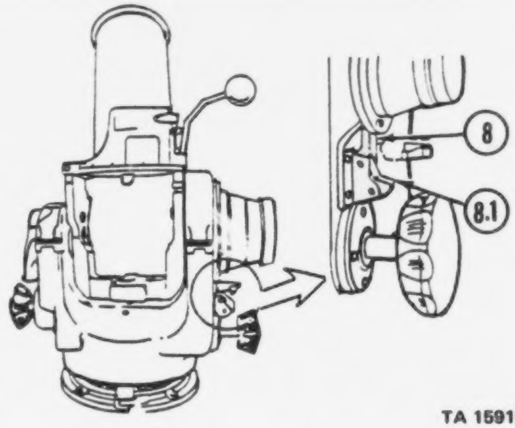
8. If not installed, install MGS, daysight/tracker, and nightsight on M901A1 vehicle and erect launcher. Turn TOW vehicle power conditioner switch (7) to ON. To check ground TOW system, assemble TOW launcher and ensure launcher is level.



WARNING

Make sure launcher is not loaded with live missiles when checking trigger in following step. Missiles may fire and cause injury or death.

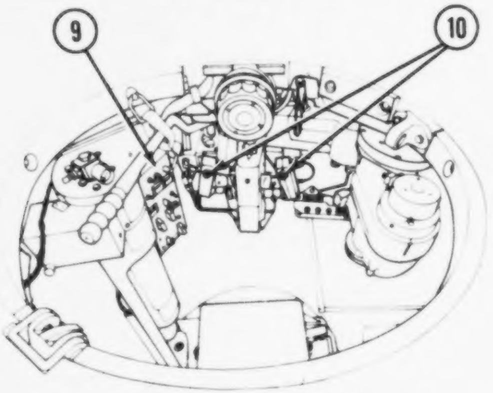
9. On ground system, lift trigger cover (8). Press trigger (8.1) and release. Lower the trigger cover. Replace traversing unit if trigger fails to spring back.



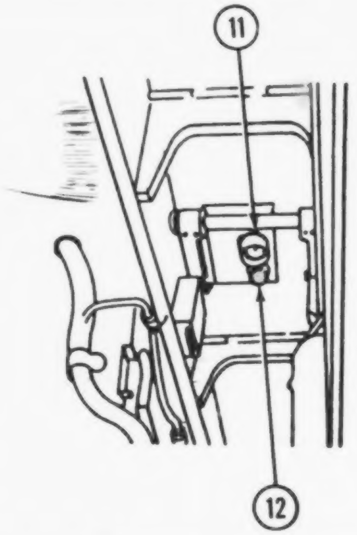
TA 159195

TURRET AND FIRE CONTROL EQUIPMENT

On vehicle system, place MISSILE SELECT switch on gunner's control panel (9) to LEFT/SEL and SAFE/ARMED switch to ARMED. LEFT SEL and LEFT ARMED indicator should illuminate. Press trigger switch on handles of hand controller (10) and release.



10. Make sure TRIGGER light on hand controls is on when trigger switch is pressed and goes OFF when released. Repeat for right launch tube. Notify organizational maintenance if unable to get proper response.



11. On vehicle system, return SAFE/ARMED switch to SAFE and MISSILE SEL switch to OFF. Place launcher to load, inspect both launch tubes for dirt and other foreign matter. Check missile latching mechanism for proper operation. Inspect umbilical connectors (11) in launch tube for damage (bent or broken pin or shell). Make sure umbilical connectors and plunger (12) are completely retracted (at least flush with outside surface). Notify organizational maintenance as necessary.

TA 159196

12. Turn ON/OFF/STBY switch (13) on nightsight to ON. If closed cycle cooler does not run:

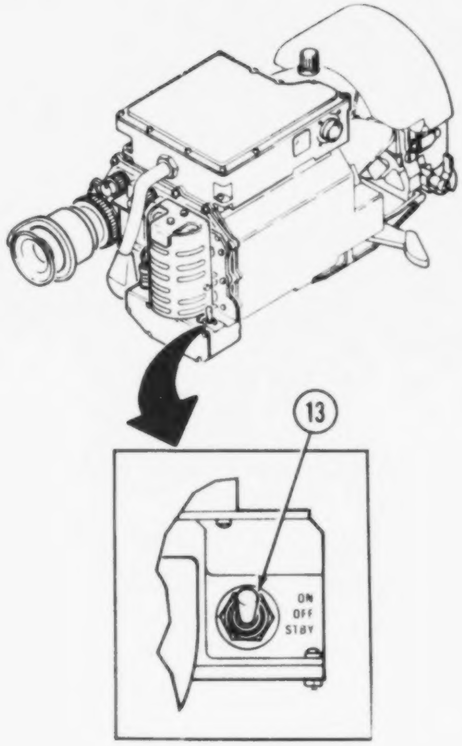
    a. Check vehicle power conditioner cable.

    b. Remove and replace nightsight.

    c. If trouble persists, notify organizational maintenance.

13. Set FOCUS control on daysight/tracker to +3 position.

14. Lift TEST/OPERATE switch cover (14) on MGS and place spring-loaded switch (15) to TEST. Hold switch in this position until completion of MGS self-test (about 20 seconds or until failure is encountered). In a successful MGS self-test, indicators (16) on the MGS will be illuminated in the following order:



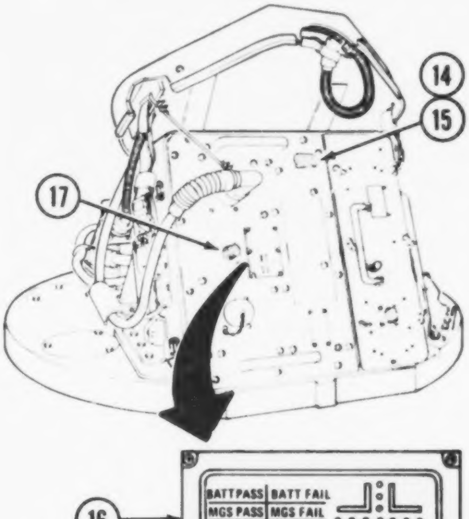
NOTE

At least two crew members are needed to perform the test if a failed condition exists.

Adjust DISPLAY INTENSITY knob (17) as required during test.

    a. All indicators, including all fail indicators and all boresight cross lamps will be illuminated for about 3 seconds.

    b. BATT PASS indicator illuminates.



TA 159198

c. MGS PASS indicator illuminates.

d. PA PASS indicator illuminates.

e. OSS PASS indicator illuminates.

f. Only green center lamp on boresight cross illuminates.

15. Perform corrective action as follows if failure occurs:

a. If no lamps/indicators are illuminated, turn DISPLAY INTENSITY knob fully clockwise. Replace battery assembly if trouble persists. Replace MGS if trouble still persists.

b. If all lamps/indicators are not illuminated for 3 seconds, replace MGS.

c. If BATT FAIL indicator illuminates, replace battery in ground system. On vehicle, replace TVPC with a TOW battery. Notify organizational maintenance if trouble persists.

WARNING

The lithium batteries used in this equipment are potentially hazardous if misused or tampered with before, during, or after discharge. The following precautions must be strictly observed to prevent possible injury to personnel or damage to equipment.

Do not heat, incinerate, crush, puncture, disassemble, or mutilate the battery.

Do not short circuit.

Do not store in equipment during long periods of unuse (in excess of 30 days).

Turn off equipment immediately if the battery compartment becomes unduly hot or rapidly increases in temperature, if the battery is venting (hissing sound) or if it has the smell of irritating sulfur dioxide gas. Remove and dispose of the battery only after it is cool (cool to touch).

Do not use carbon dioxide extinguishers on exposed lithium metal fires. Flood the burning material with water or use graphite type compounds or extinguishers to extinguish the burning lithium.

TA 159199

d. If MGS FAIL indicator illuminates, replace MGS.

e. If MGS PASS indicator does not glow steadily:

(1) Set nightsight field-of-view switch to NFOV.

(2) Replace nightsight.

f. If PA FAIL indicator illuminates and OSS PASS indicator illuminates:

(1) Check to see that nightsight is on and functioning. Ensure that cables are properly connected.

(2) Replace nightsight.

(3) Notify organizational maintenance if trouble persists.

g. If OSS FAIL indicator illuminates:

NOTE

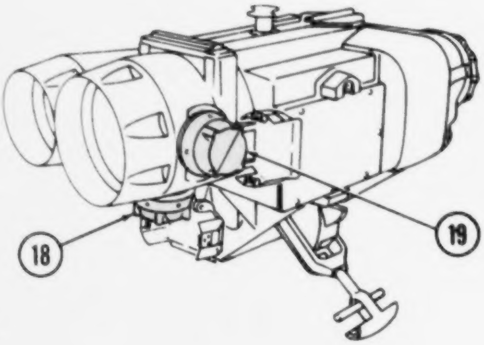
Turning the EL boresight knob will move the lights on boresight cross up or down. The AZ knob will move the lights left or right.

(1) Turn AZ (19) and EL (18) adjustment knobs on daysight/tracker fully in one direction, then back, then off 3 or 4 turns and repeat test.

(2) Replace daysight/tracker.

(a) On ground TOW system replace battery power conditioner batteries.

(b) On ground TOW system replace battery power conditioner.



h. If OSS PASS indicator does not glow steadily:

(1) Adjust boresight knobs until OSS PASS indicator does not blink.

(2) If OSS PASS indicator still does not glow steadily, replace daysight/tracker.

TA 159260

i. If OSS PASS indicator does glow steadily, the daysight/tracker is not boresighted; turn azimuth and elevation boresight adjustment knobs until green center lamp in AZIMUTH/ELEVATION cross is lit and glowing steadily.

  (1) If AZIMUTH/ELEVATION cross does not glow steadily, reset boresight knobs to near center and replace daysight/tracker.

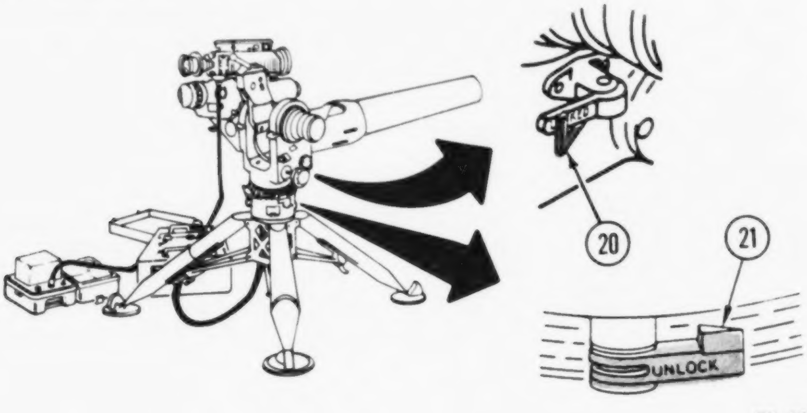
  (2) If AZIMUTH/ELEVATION cross glows steadily, the daysight/tracker is boresighted; proceed to step j.

j. If green lamp in center of boresight cross is not illuminated or is blinking, adjust EL (18) and AZ (19) boresight knobs on daysight/tracker as necessary.

16. On ground system, turn elevation lock (20) to UNLOCK and, while holding the TEST/OPERATE switch to TEST, move launch tube up and down. Lights on boresight cross of MGS should move up for elevation and down for depression. Replace traversing unit if unable to get proper response. Replace MGS if trouble persists.

    On vehicular system, use gunner's hand controls to elevate and depress launcher while holding the TEST/OPERATE switch to TEST and observing the boresight cross. Replace the MGS if lights on boresight cross fail to move up for elevation and down for depression of launcher. Notify organizational maintenance if trouble persists.

17. On ground system, return elevation lock to LOCK position. Move launch tube up or down until it locks. Turn azimuth lock (21) to UNLOCK. While holding the TEST/OPERATE switch to TEST, turn launch tube left and right. Lights on boresight cross should move left for left rotation and right for right rotation of launch tube. Replace traversing unit if unable to get proper response. Replace MGS if fault persists. Return azimuth lock to LOCK and rotate traversing unit until it locks upon completion of this step.



TA 159201

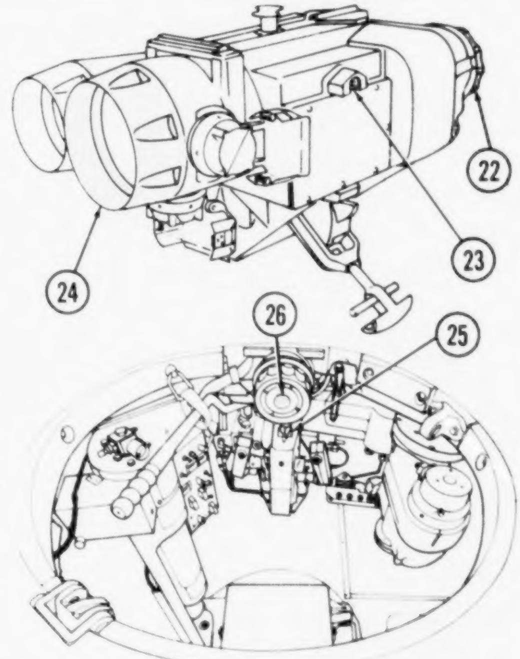
TURRET AND FIRE CONTROL EQUIPMENT

On vehicle system, use gunner's hand controls to traverse turret left and right while holding the TEST/OPERATE switch to TEST and observing the boresight cross on MGS. Lights on cross should move left for left rotation and right for right rotation of turret. Replace MGS if unable to get proper response. Notify organizational maintenance if trouble persists.

NOTE

It may be necessary to cover front lens of daysight/tracker visual channel (24) to see if reticle is lit.

18. On ground system, set focus control (22) on daysight/tracker to − 0 + and RETICLE LIGHT switch (23) to ON. Then adjust focus control while looking into the eyepiece for sharp focus of crosshairs. Reticle should be lit with red glow. (See note.) Replace daysight/tracker if unable to adjust focus and/or if reticle is not illuminated. Turn reticle light off after completion of this test to conserve battery power.



On vehicle system, refer diopter ring to 0, set RETICLE LIGHT switch (23) to ON, and turn sight select switch (25) on hand controls to 13X. Look into ITA eyepiece (26) and adjust focus control. If unable to adjust focus and/or to get reticle light to illuminate, perform checkout in ground mode to ensure serviceability of daysight/tracker (see note). Notify organizational maintenance if trouble persists and daysight/tracker checks out good.

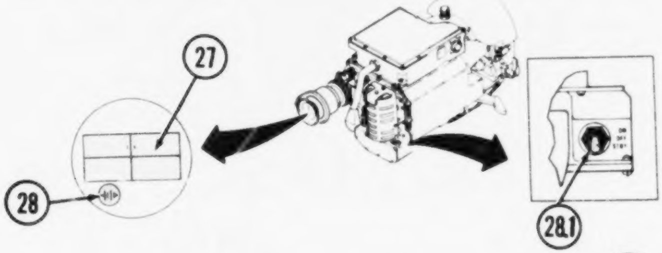
NOTE

For ground mode operation a security shutter is molded into eyeshield of nightsight. Shutter will open when eye is pressed against eye cup. When nightsight is used on vehicle, the shutter is removed.

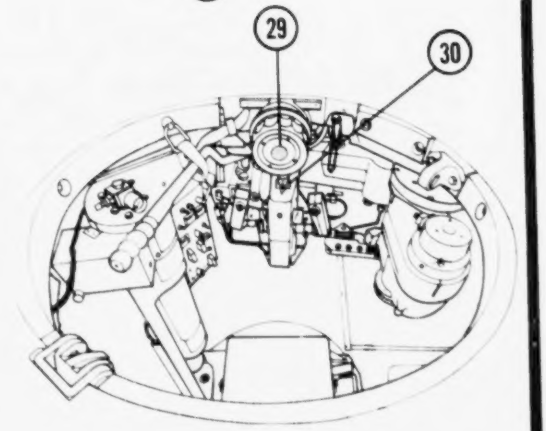
TA 159202

TURRET AND FIRE CONTROL EQUIPMENT

19. For ground system checkout, press eye against eye cup of nightsight and look into eyepiece. Reticle (27) should be lit, and battery monitor (28) should not be lit. Replace nightsight power conditioner battery if reticle light is not lit and/or battery monitor light is on.



On vehicle system, set sight select switch (30) on hand controls to NIGHT, and look through ITA eyepiece (29). Reticle (27) should be lit, and battery monitor (28) should not be illuminated. Notify organizational maintenance if battery monitor is on and/or reticle is not illuminated.



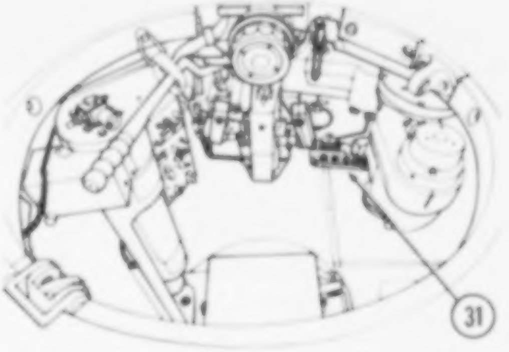
20. On either ground system or vehicle system, check the STBY mode of the nightsight closed cycle cooler as follows:

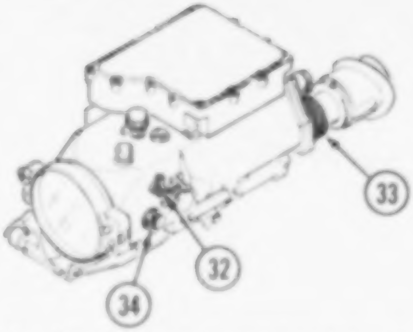
    a. Set ON/OFF/STBY switch (28.1) on nightsight to STBY. If the closed cycle cooler does not run continuously for 160 seconds and then cut off, the STBY mode of the ON/OFF STBY switch is inoperative. The nightsight can still be operated in the ON position if the STBY mode does not work. Continue checkout procedures (step 21) and notify organizational maintenance. If normal, proceed to step b below.

    b. If the closed cycle cooler does not cycle off for 100 seconds, then on for 20 seconds in the STBY mode, the STBY mode of the ON/OFF/STBY switch is inoperative. The nightsight can still be operated in the ON position if the STBY mode does not work. Continue checkout procedures (step 21) and notify organizational maintenance. If normal, proceed to step 21.

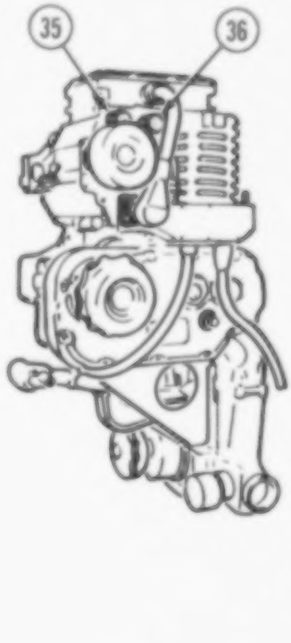
TA 159203

TURRET AND FIRE CONTROL EQUIPMENT





21. Set field-of-view selector (32) to NFOV (use remote controls (31) on vehicle system). View an object and adjust focus control (33) on nightsight (ITA eyepiece on vehicle) for best focus of reticle. In ground system checkout, replace nightsight if reticle is not sharp and clear. If unable to get sharp and clear reticle on vehicle system, perform checkout of nightsight in ground mode. Notify organizational maintenance if nightsight checks out good and trouble persists.



22. Adjust BRT (35), CTRS (36) and RANGE focus (34) knobs on nightsight (use remote controls on vehicle mounted system) for best focus of displayed image. Replace nightsight if unable to get sharp, clear image or if controls do not respond properly. Notify organizational maintenance if remote controls are suspected.

TA 159205

NOTE

When changing field-of-view selector do not disturb RANGE FOCUS knob. If RANGE FOCUS knob is accidentally moved, the system will lose focus and the nightsight might needlessly be replaced by way of corrective action.

23. Set field-of-view selector (32) on nightsight (use remote controls on vehicle system) to WFOV. Replace nightsight if image goes out of focus and/or field-of-view does not allow a larger viewing area in WFOV setting. If nightsight remote controls are suspected, notify organizational maintenance.

WARNING

Latches on boresight collimator case snap open rapidly. Be careful when opening case so injury to fingers does not occur.

CAUTION

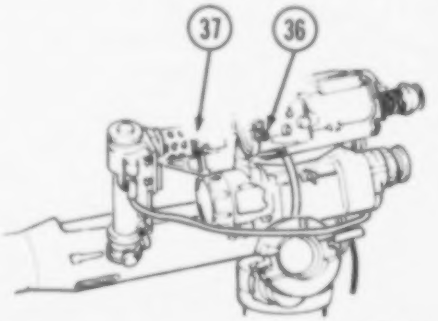
Be careful when handling boresight collimator. Boresight collimator is precision electro-optical instrument. Rough handling could damage boresight collimator.

24. Check ITA alinement with daysight/tracker and nightsight. Adjust as required.

25. Remove boresight collimator from case.

26. Inspect and clean mounting surfaces of nightsight and boresight collimator if necessary, to make sure of proper mounting for boresight accuracy.

27. Position boresight collimator over pins and pads (36) of nightsight. Push in and turn securing latches (37) to lock collimator to nightsight.

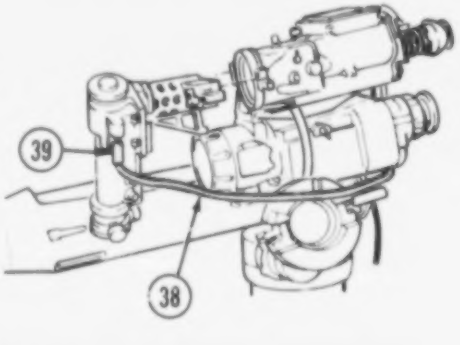


TA 159206

28. Remove dust cover(s) from end(s) of boresight collimator power cable (38). Connect boresight collimator power cable to boresight collimator connector 3J1 (39).

29. In ground system checkout, look into the daysight/tracker.

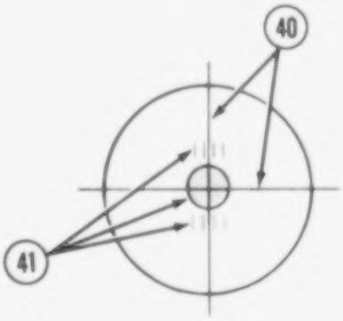
    On vehicle system, place the sight select switch on gunner's hand controls to 13X and look into the ITA eyepiece.



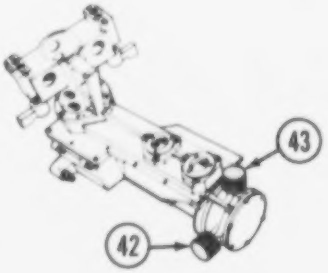
NOTE

Boresight picture shows perfect alinement of the two reticles. Boresight collimator reticle consists of a dot in a circle with bars and slashes above and below circle.

30. Make sure the crosshairs of the daysight/tracker (40) and the boresight collimator reticle (41) are seen. (See note.) Replace boresight collimator if unable to see boresight reticle. If trouble persists, replace collimator. If trouble continues, replace daysight/tracker.



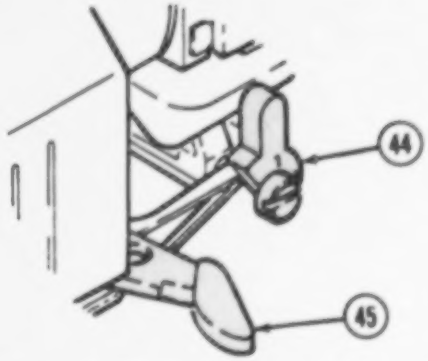
31. If boresight collimator reticle (41) is not centered on crosshairs of daysight/tracker as shown, adjust boresight collimator EL (43) and AZ (42) adjustment knobs until perfect alinement is achieved.



TA 159207

NOTE

Do not place left hand on nightsight to support it. Doing this could cause misalinement.

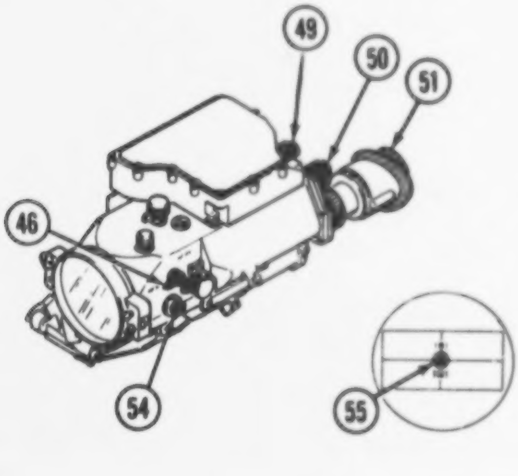


32. If unable to aline reticles, loosen nightsight by moving latch handle (45) to the rear position. Move the AZ knob (44) to the No. 2 position. Then, using the right hand only, push the handle forward to reengage the nightsight. Replace collimator if still unable to obtain proper alinement. Adjust boresight collimator EL (43) and AZ (44) adjustment knobs until perfect alinement is achieved.

CAUTION

Do not operate NIGHTSIGHT range FOCUS control from gunner's station unless nightsight is installed. Damage to equipment may occur.

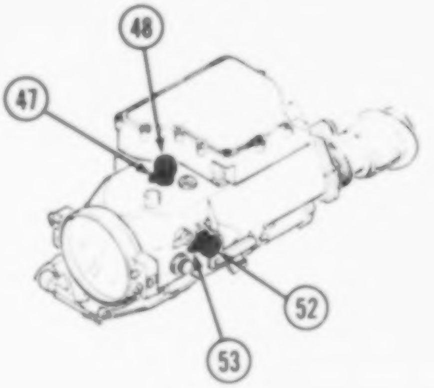
33. On ground system, turn field-of-view selector on nightsight (46) to NFOV. Look into nightsight eyepiece (51), and adjust BRT (50), CTRS (49), and RANGE FOCUS (54) knobs for best focus of boresight reticle (55). Replace collimator if unable to obtain a clear, sharp reticle. If fault persists, replace nightsight.



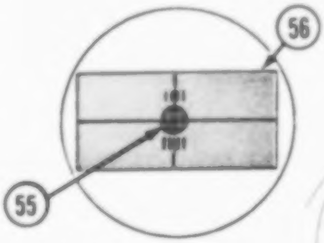
TA 159208

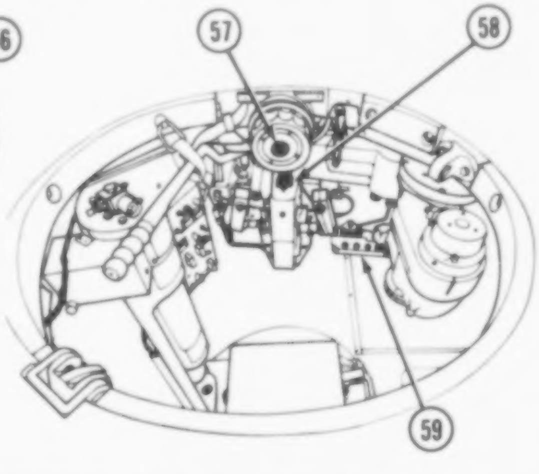
TURRET AND FIRE CONTROL EQUIPMENT

On vehicle, pull FOV selector on nightsight remote control panel (59) all the way out to select NFOV, and turn sight select switch (58) to NIGHT, then look into ITA eyepiece (57) and, using remote controls (59), adjust BRT, CTRS, and RANGE FOCUS on nightsight for best focus of boresight reticle (55). Replace collimator if unable to obtain clear, sharp reticle. If fault persists, replace nightsight.



34. If boresight reticle (55) is not centered on nightsight reticle (56) as shown, turn AZ (53) and EL (47) locking levers fully counterclockwise. Adjust AZ (52) and EL boresight knobs (48) as necessary for perfect alinement of the centers of the reticles.





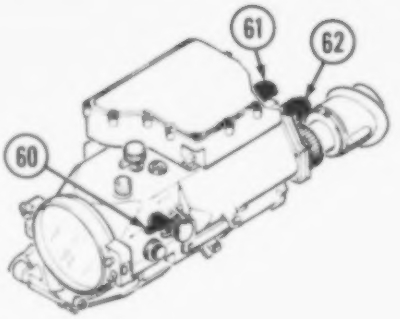
35. If unable to aline reticles, place coarse AZ knob to position No. 2 as described in step 32 above and repeat procedure starting with step 29. If knob is already in position No. 2, replace nightsight.

36. Turn AZ (53) and EL (47) locking levers fully clockwise and recheck sight picture. Repeat steps 34 and 36 as necessary to obtain close alinement.

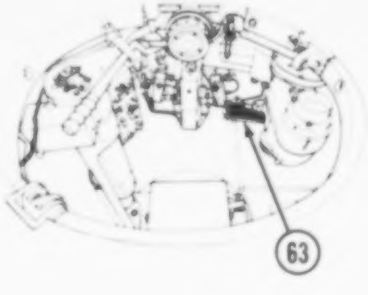
37. Look into eyepiece of daysight/tracker and check alinement of boresight collimator reticle, if crosshairs of daysight/tracker are not alined with boresight collimator repeat steps 29 through 37.

TA 159209

38. In ground mode, turn field-of-view selector (60) on nightsight to WFOV and adjust CTRS (61) and BRT (62) controls for best image of boresight collimator. Replace nightsight if reticle is not in close alinement with nightsight reticle.



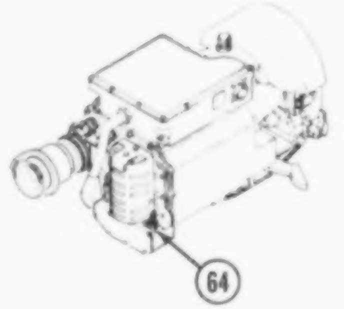
On vehicle system, use nightsight remote controls (63) to select WFOV and to adjust brightness and contrast on nightsight for best image of boresight reticle. Replace nightsight if reticle is not in close alinement with nightsight reticle.



39. Remove boresight collimator power cable from collimator and stow in range focus clip. Remove boresight collimator and stow.

40. Repeat step 19 to recheck nightsight battery power conditioner/vehicle power conditioner.

41. Set ON/OFF/STBY switch (64) to OFF position.



42. System checkout complete.

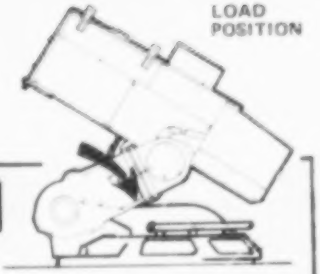
NOTE

If checkout is complete and launcher is erect, refer to page 2-164.3 for stowing launcher.

TA 159210

TURRET AND FIRE CONTROL EQUIPMENT

MISSILE LOADING/RELOADING



WARNING

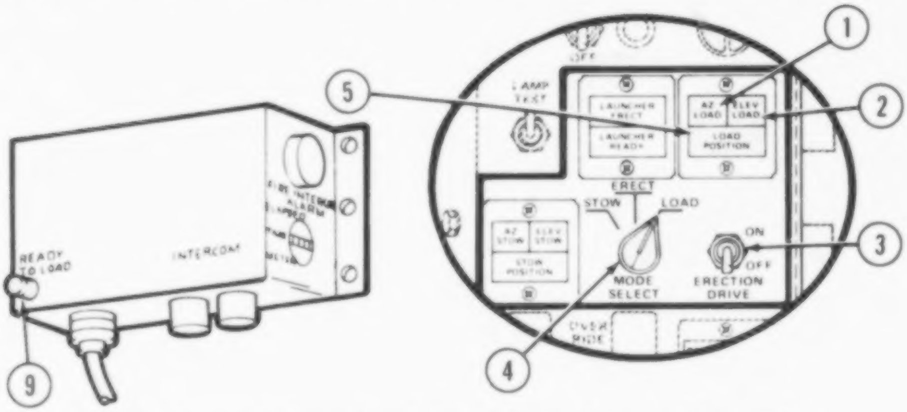
Do not load a missile if the TRIGGER light is on.

Do not load a missile if there is reason to believe that the missile has been damaged or there is evidence of launch container deformation (other than minor deformation of end rings) or fracture. An encased missile should be returned to the ammunition supply point (ASP) for inspection.

WARNING

During normal operation, monitor BATTERY GENERATOR indicator on driver's instrument panel. If indicator indicates in red sector while turret is operating, stop operation and start engine. Idle engine at 1000 rpm. Note that indicator returns to green sector.

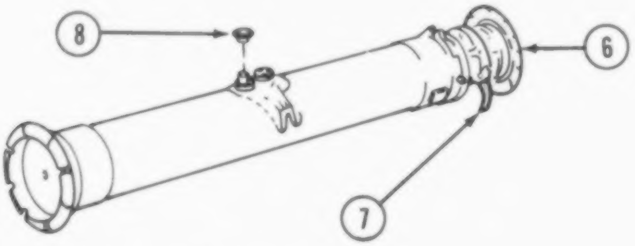
TA 112639


1
2
3
4
5
9
READY TO LOAD
INTERCOM
LAMP TEST
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
AZ STOW
ELEV STOW
STOW POSITION
ERECT
STOW
LOAD
MODE SELECT
ON
OFF
ERECTION DRIVE
OVERRIDE

1. Place machinegun in stowed position, and erect launcher if stowed.
2. Use hand controls to rotate turret to zero degrees in azimuth. (AZ LOAD light (1) will come on at this position.)
3. Elevate launcher until ELEV LOAD light (2) is on. Light comes on at +35 degrees elevation.
4. Turn MODE SELECT switch (4) to LOAD.
5. Push up on ERECTION DRIVE switch (3) and hold until LOAD POSITION light (5) comes on and launcher is in LOAD POSITION. Release ERECTION DRIVE switch.

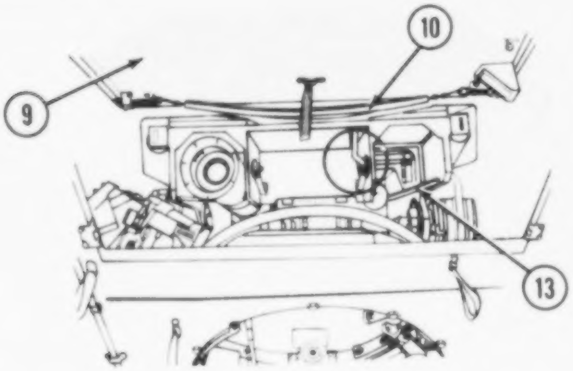
NOTE

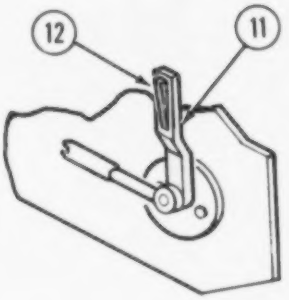
The READY TO LOAD light (9) on the fire interrupt/intercom assembly will also be on indicating to the loader to proceed with loading the launcher.



6. Select a missile and remove quick release clamp (7).
7. Remove forward handling ring (6) and electrical dust cover (8).

TA 070919





8. If both launch tubes are to be loaded, place second missile on floor and repeat steps 6 and 7.

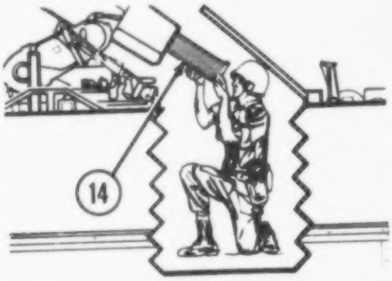
9. Open cargo hatch (9) by pulling latch release cord (10) and pushing up on door until latch falls into first detent.

10. Remove expended missile container by holding it with one hand while pushing missile locking handle (11) up with the other hand. Squeeze detent (12) with the palm of the hand to release it.

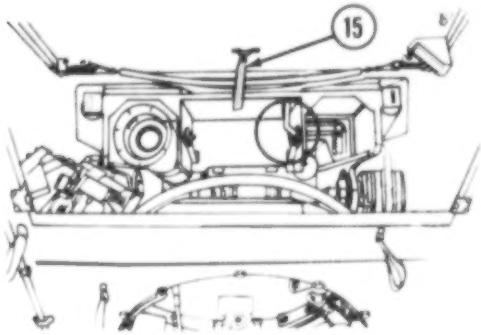
11. Remove empty container and throw over left side of vehicle.

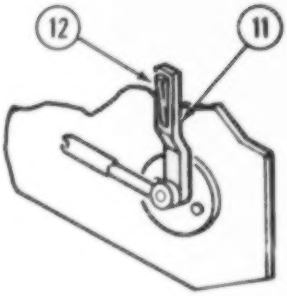
12. Load a new missile as follows:

    (a) Place indexing lugs of encased missile (14) on launcher guide rails (13).



TA 112640





(b) Slide missile forward so that forward end of missile seats against forward centering ring.

CAUTION

Ensure missile is fully seated against the front of the launch tube before engaging the missile latching handle. If abnormal force (greater than 30 pounds) is required to lock the missile latching handle, place the latching handle in the unlocked position and reseat the missile, ensuring it is fully seated against the front of the launch tube. Raise the missile up firmly against the launcher guide rails and attempt to place the missile latching handle to the locked position. If abnormal force is still required to lock the missile latching handle, remove the missile and inspect it for damage. If the missile is damaged, discard it and load a serviceable missile into the launch tube. If the missile is not damaged, notify organizational maintenance. Failure to observe this caution may result in damage to the system.

(c) Hold missile up and in place while pulling down locking handle (11).

(d) Repeat 12 (a) thru (c) for other missile if two are to be loaded.

13. Close cargo hatch by pulling strap (15) and make sure CARGO HATCH indicator light goes off.

14. Turn MODE SELECT switch to ERECT.

TA 112641

TURRET AND FIRE CONTROL EQUIPMENT

15. Push ERECTION DRIVE switch up and hold until LAUNCHER ERECT and LAUNCHER READY lights come on and launcher is erected.

WARNING

Do not operate gunner's hand controls unless both the LAUNCHER ERECT and LAUNCHER READY indicators on gunner's control panel are lit. Failure to observe this warning may cause launcher to fall resulting in serious injury to personnel and damage to equipment.

TARGET ACQUISITION, TRACKING, AND FIRING

WARNING

Although fumes are not poisonous they can cause suffocation. Open all hatches if missile exhaust fumes enter the vehicle.

CAUTION

The accuracy of the missile and the odds of getting a hit will be seriously affected if the sideways tilt angle of the launcher and vehicle is greater than 10°. MAKE SURE THAT THE LAUNCHER'S SIDEWAY TILT IS LESS THAN 10° IN THE DIRECTION OF FIRE BEFORE FIRING.

Use the slew mode (one or both action switches and one or both slew switches simultaneoulsy depressed) to acquire a target. Use the track mode (action switch(es) alone depressed) to track a target once it has been acquired. Using track mode for both acquisition and tracking of a target may cause excessive voltage drain of vehicle batteries and overheating of system hydraulic components.

Missile flare will be visible to the gunner. DO NOT TRACK THE MISSILE OR ATTEMPT TO GUIDE THE MISSILE TO THE TARGET.

ALWAYS TRACK TARGET CENTER OF MASS, TRACK SMOOTHLY, AND KEEP TRACKING UNTIL IMPACT.

TA 112642

Daylight Firing. During periods of good visibility, acquire, track, and fire as follows:

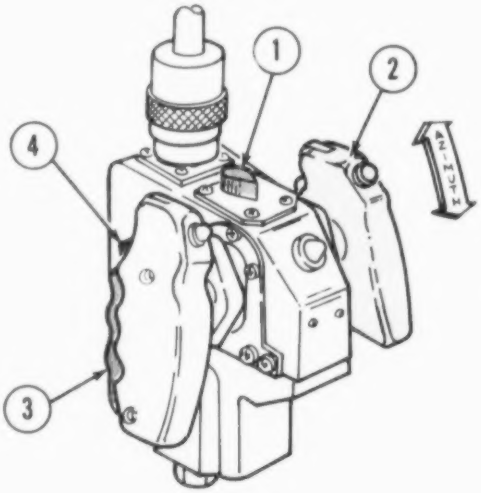
1. Make sure launcher is erected, turret power is on, LAUNCHER ERECT and LAUNCHER READY indicators are lit, and all hatches are closed.

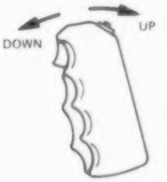
2. Turn the sight select switch (1) to 3X to place the 3X telescope of the ITA in operation.

WARNING

Do not operate gunner's hand controls unless both the LAUNCHER ERECT and LAUNCHER READY indicators on gunner's control panel are lit. Failure to observe this warning may cause launcher to fall resulting in serious injury to personnel and damage to equipment.

3. Turn turret in the general direction of the threat by grasping one or both control handles (2) and turning them clockwise for right rotation and counterclockwise for left rotation, while squeezing one or both slew switches (4) and action switches (3).



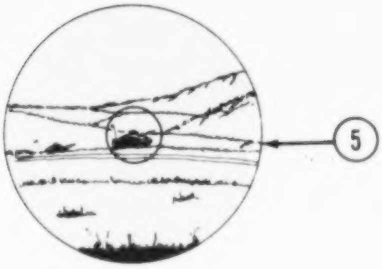


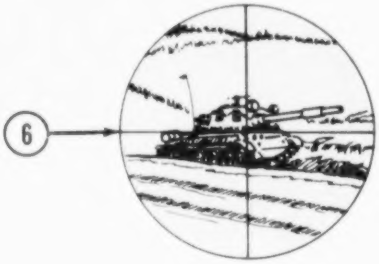
4. Elevate or depress the launcher with either one or both control handles. Pushing the top of the handle forward, while squeezing one or both action switches, lowers the launcher; pulling it back raises it.

TA 157908

5. Center the reticle on the target as shown in sight picture (5).

6. Turn the sight select switch to 13X. (Line of sight to target is now through the daysight/tracker.) Look for sight picture (6).





NOTE

Before doing step 7 make sure fire interrupt lights are off.

7. Turn MISSILE SELECT switch to LEFT or RIGHT, depending on which missile is to be fired. LEFT SEL or RIGHT SEL lamp should light. Place SAFE/ARMED switch to ARMED while keeping the reticle on the target.

TA 112644

CAUTION

Do not operate the hydraulic system to traverse or elevate the launcher continuously for long periods. Hydraulic components get hot and must be allowed to cool after hard use.

8. Look for the LEFT SEL and LEFT ARMED or the RIGHT SEL and RIGHT ARMED lights on the control panel, depending on which missile was selected.

9. Press either or both trigger switches on command of the squad leader and keep tracking the target until impact. If missile does not launch within 1.5 seconds, press both trigger switches again.

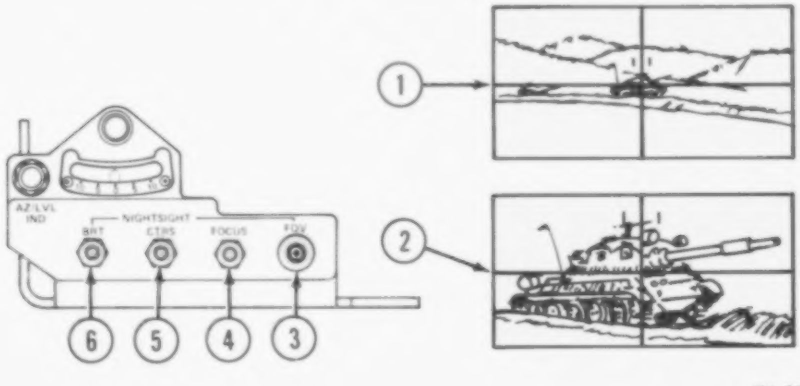
WARNING

There is a normal 1.5-second delay between the time the trigger switch is pressed and the missile is ignited. If missile does not fire within 1.5 seconds after trigger is pressed the second time, see procedures on page 2-163.

10. Select a second missile or reload to engage another target if applicable. Repeat procedure.

Night Firing. To track and fire at night and during other periods of low visibility, place the sight select switch to NIGHT and FOV selector (3) to wide field-of-view (selector pushed in). When reticle is approximately centered on target as shown in sight picture (1), pull selector all the way out to change to narrow field-of-view as shown in sight picture (2). Operate BRT (6), FOCUS (4), and CTRS (5) controls as necessary for a distinct clear target picture.

Use turret controls and fire missile as in procedure for daytime firing.



TA 070923

TURRET AND FIRE CONTROL EQUIPMENT

FIRING MALFUNCTIONS

After pressing the trigger, a firing malfunction exists if: (1) the missile does not launch after 1.5 seconds (misfire); (2) the missile misses the target because of trouble in the missile or launcher (guidance failure); or (3) the missile fails to explode when it hits the target (dud).

Misfires. If the missile fails to launch after the 1.5-second delay, take the following steps:

1. Press both trigger switches.
2. If the missile still fails to launch, announce "MISFIRE".
3. Continue tracking the target.

CAUTION

In a training situation, remove the battery or TVPC from the MGS before turning the MISSILE SELECT switch to the other missile and/or the SAFE/ARMED switch to the SAFE position. Failure to do this will cut the command link wire and damage the missile.

4. Select and arm the other missile, and attempt to fire.
5. If the second missile also fails to launch, proceed as follows:
   a. Check for popped out LEFT (or RIGHT) REMOTE ARM circuit breaker. Push in circuit breaker if it's out.
   b. Check to make sure LEFT SEL and LEFT ARMED (or RIGHT SEL and RIGHT ARMED) indicators are on. If off, turn SAFE/ARMED switch to SAFE and MISSILE SELECT switch momentarily to OFF, and re-select and re-arm the selected missile.

WARNING

Be sure to use all safety precautions. DON'T FIRE INTO THE VEHICLE if override is used.

   c. Check to see if fire interrupt and/or hatch open lights are on. If both hatch and fire interrupt lights are on, make an attempt to get rid of the interrupt light by opening and closing the hatch. If only the interrupt indicator is on, move the vehicle or, if possible, select another target. If tactical conditions require, use the OVERRIDE switch.
   d. Check cable connection to MGS and make sure it's on tight.
   e. On M901 system, check condition of MGS battery by turning MGS SELF TEST switch to position 1 and holding the TEST/OPERATE switch to TEST while looking at the MGS ELEVATION and AZIMUTH SELF TEST METERS. Battery is good if both meters indicate in-band. Replace battery with EMER PWR battery if bad.

TA 159211

f. On M901A1 system, perform MGS and TOW vehicle system checkout procedure on page 2-156.2 through battery check.

6. Make two more attempts to fire.

7. If missile still fails to launch, place the SAFE/ARMED switch to SAFE and the MISSILE SELECT switch to OFF and announce "MISSILE SAFE, SELECT OFF".

NOTE

On a training mission all crew members would remain at their stations for 30 minutes after step 6, before continuing with next step.

8. Pivot steer the vehicle 90 degrees left or right while traversing the turret to keep the launcher aimed at the target area.
9. Open the cargo hatch to the 90-degree position.
10. Go to top deck through cargo hatch and remove misfired missile(s) with launcher erected and carefully hand them down to another crew member waiting on the left side of the vehicle.

WARNING

Do not stand in front or back of launcher while unloading misfired missiles.

11. Place unfired missile a safe distance away from vehicle. Point missile warhead in the direction of the target area.

NOTE

FM5-25 considers 300 yards away from vehicle a minimum safe distance, not counting secondary missile hazards. This distance may be unrealistic under combat conditions and would have to be modified as the situation requires.

12. In a training situation, notify explosive ordnance personnel to dispose of missile as required.

TA 159212

TURRET AND FIRE CONTROL EQUIPMENT

Failure to De-arm. If a remote arming device (RAD) fails in the armed state and cannot be driven to the safe state, the following procedure may be used by the crew to manually de-arm the failed RAD.

WARNING

If a live round (or a misfire) is in the launch tube of the failed RAD, extreme care must be taken not to depress either trigger switch on the gunner's hand controls. Remove the missile guidance set battery from the missile guidance set and make sure that the launcher is always pointed in a safe direction during and after depressurization of the turret hydraulic system.

1. Depressurize the turret hydraulic system using the procedures on page 2-134.
2. Pull the RIGHT REMOTE ARM or LEFT REMOTE ARM circuit breaker (corresponding to the failed RAD) on the gunner's control panel. (Turret power should also be off.)

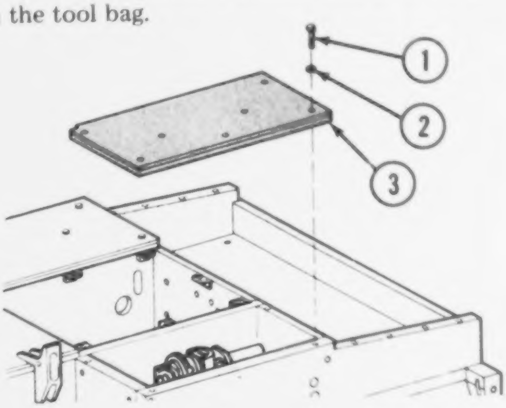
WARNING

If a misfired missile is in the launch tube, avoid the missile back-blast zones and the muzzle of the launcher. (See page 2-130.)

NOTE

On training missions, wait 30 minutes before proceeding to the next step if a misfired missile is in the launch tube.

3. Remove 5 bolts (1) and 5 washers (2) nearest the edges of the RAD cover (3) using the 7/16-inch open-end wrench and/or the adjustable open end wrench from the tool bag.



TA 112645

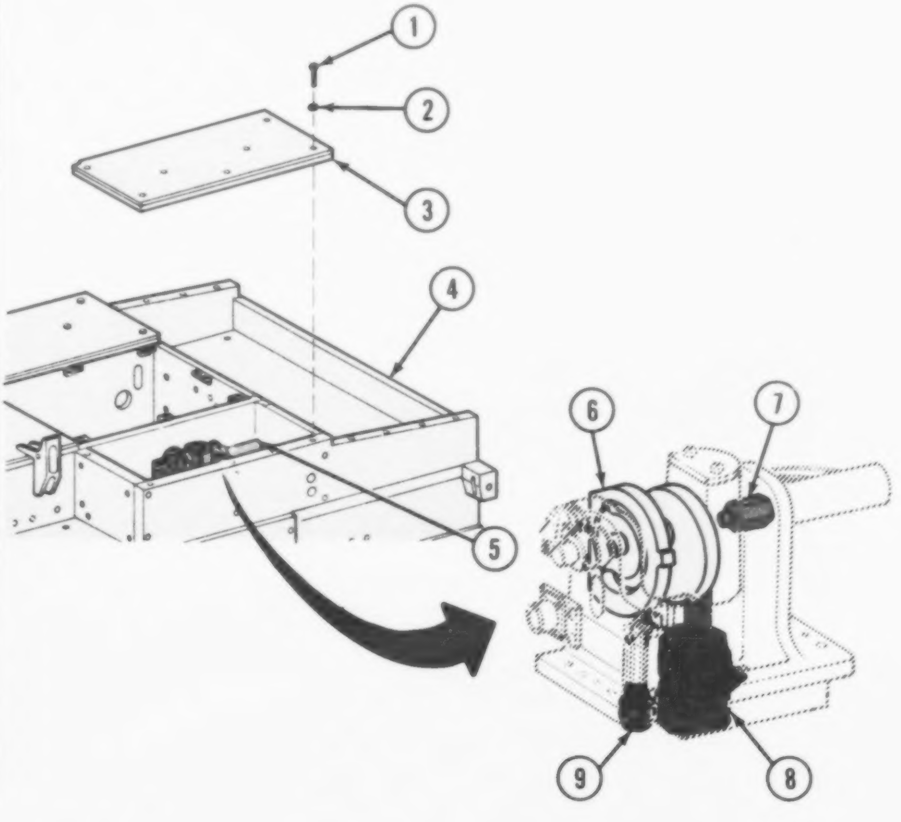
NOTE

Do not remove the 2 bolts from the center of RAD cover (3).

4. Remove RAD cover (3) from launcher (4).

5. Rotate cam (6) on RAD (5) until connector (8) and plunger (9) are fully retracted. If the RAD is jammed, use the adjustable open-end wrench to turn coupling (7).

6. Replace RAD cover (3), 5 washers (2), and 5 bolts (1).



TA 112646

Guidance Failure. Failure of the missile to hit the target can be attributed to 3 causes:

1. Defective missile.

2. Operator error.

3. Defective launcher on fire control equipment.

While an experienced gunner can usually tell if he made a tracking error, it is more difficult to distinguish between a defective missile and a defective launcher and fire control system.

On M901 system, perform a complete MGS self-test as soon as tactical situation permits. Perform MGS and nightsight check and alinement procedure if failure occurred at night, using the nightsight.

On M901A1 system, perform complete system checkout on page 2-156.2 as soon as tactical situation permits.

Duds. If a missile (warhead) fails to explode on impact, fire a second missile.

STOWING LAUNCHER

Except for certain emergencies discussed in section IV, Operation Under Unusual Conditions, the launcher is placed in the stow position prior to travel. Stow launcher as follows:

WARNING

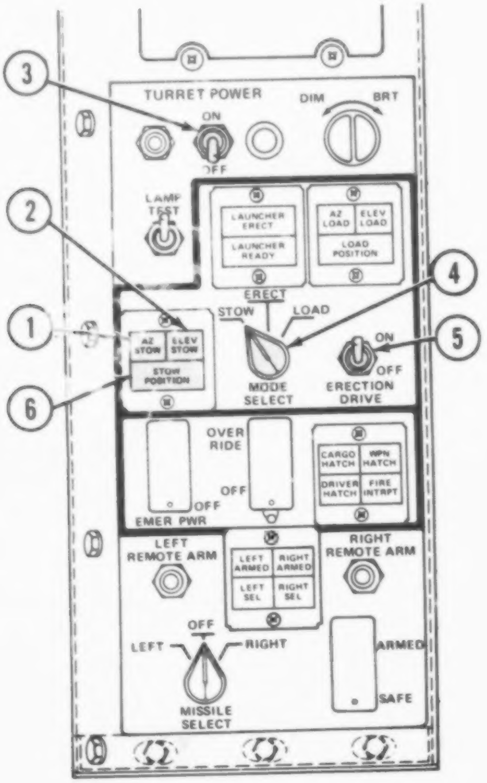
Do not operate gunner's hand controls unless both the LAUNCHER ERECT and LAUNCHER READY indicators on the gunner's control panel are lit.

If the AZ STOW or ELEV STOW indicator goes out at any time while the launcher is being stowed, erect the launcher and check that the LAUNCHER ERECT and LAUNCHER READY indicators are lit before moving the launcher to relight both stow indicators. Failure to observe this warning may cause the launcher to fall resulting in serious injury to personnel and damage to equipment.

TA 159213

TURRET AND FIRE CONTROL EQUIPMENT

1. Use hand controls to rotate turret in azimuth until AZ STOW lamp (1) lights, then elevate to maximum and depress launcher until ELEV STOW lamp (2) lights.
2. Turn MODE SELECT switch (4) to STOW.
3. Place and hold the ERECTION DRIVE switch (5) to ON. Release when STOW POSITION lamp (6) lights and launcher is in the stow position.
4. Turn TURRET POWER switch (3) to OFF.


3
TURRET POWER
ON
OFF
DIM
BRT
LAMP TEST
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
2
4
ERECT
STOW
LOAD
1
AZ STOW
ELEV STOW
STOW POSITION
5
ON
OFF
6
MODE SELECT
ERECTION DRIVE
OVER RIDE
OFF
OFF
EMER PWR
CARGO HATCH
WPN HATCH
DRIVER HATCH
FIRE INTRPT
LEFT REMOTE ARM
LEFT ARMED
RIGHT ARMED
LEFT SEL
RIGHT SEL
RIGHT REMOTE ARM
OFF
LEFT
RIGHT
ARMED
SAFE
MISSILE SELECT

TA 157909

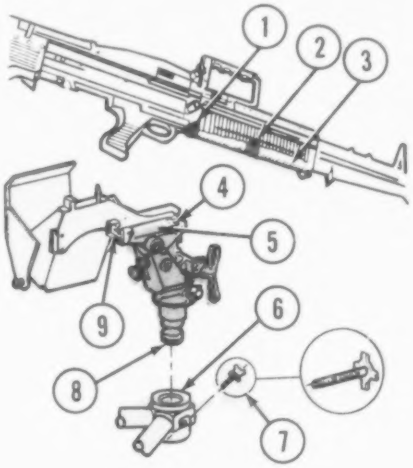
OPERATING THE M60 MACHINEGUN

GENERAL

To prepare, operate, and dismount the machinegun, use these procedures. Refer to FM23-67 for additional machinegun operating instructions and crew training. Perform the before-firing services described in the Preventive Maintenance Checks and Services.

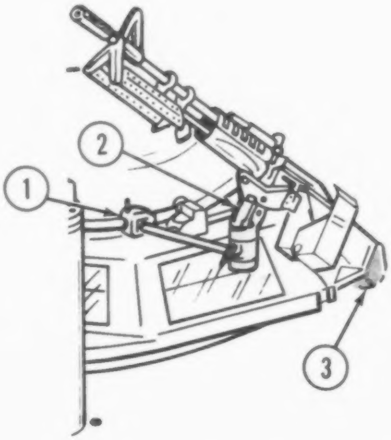
WARNING

Ear protection must be worn when firing the M60 machinegun.



INSTALLATION OF MACHINEGUN AND MACHINEGUN MOUNT

1. Insert pintle (8) of machinegun mount into socket (6) of pintle mount.
2. Tighten handle (7).
3. Check to make sure that pintle rotates freely and doesn't bind.
4. Place machinegun on machinegun mount (5), making sure the front locating pin (3) in the mounting recess (2) engages the front mounting lug (4).
5. Lower the butt of the gun onto the machinegun mount to engage mount latch (9) with rear locating pin (1). Gun will snap in place.



PREPARATION FOR TRAVEL

1. Bring pintle mount frame (1) to extreme left side of turret and lock in place.
2. Push butt of gun down into the travel lock receiver (3). Spring-loaded travel lock (2) will automatically engage gun in the raised position.

CAUTION

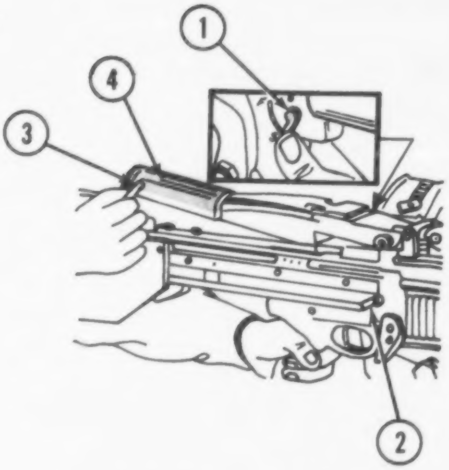
Make sure gun is in the stowed position as shown, when operating turret and during travel.

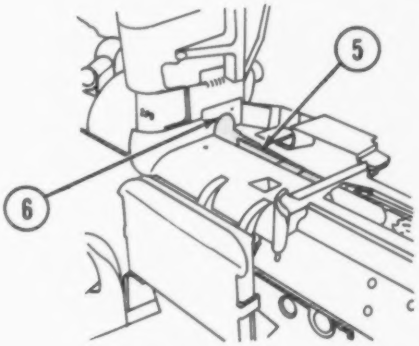
TA 070927

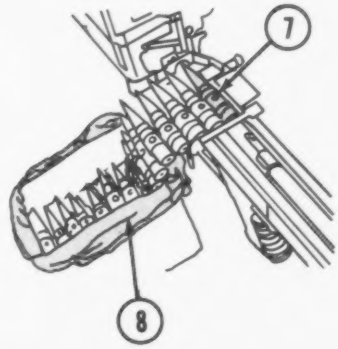
OPERATING THE M60 MACHINEGUN

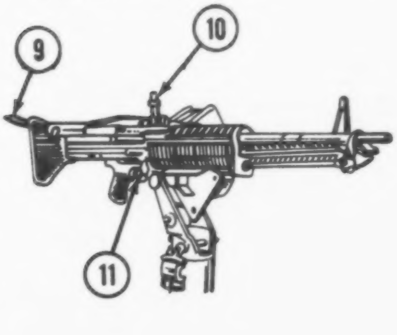
LOADING AND FIRING

1. Push forward on travel lock. Raise butt of gun out of travel lock and swing mount around to desired position. Use brake lever to secure in position.
2. Place safety (1) on F (fire).
3. Pull the bolt to the rear using the cocking handle (2).
4. When the bolt is held to the rear by the sear, return the cocking handle to the forward position, and place the safety on S (safe).
5. Turn the latch lever (3) and raise cover (4).
6. Make sure feedtray groove (5) and chamber (6) are clear.
7. Place the first round (7) of the bandoleer (8) in the feedgroove and close the cover. Make sure round stays in the groove while closing the cover.
8. Raise rear sight (10). (Sight should be at proper battlesight setting from previous firing for zero.) Adjust as necessary.









9. Raise shoulder rest (9).
10. Remove safety, aim, and fire by squeezing trigger (11).

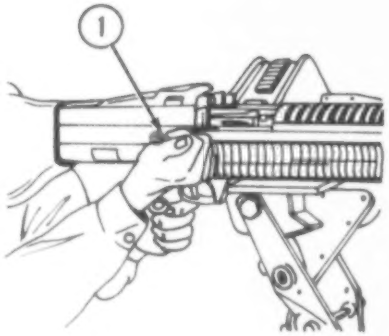
TA 158951

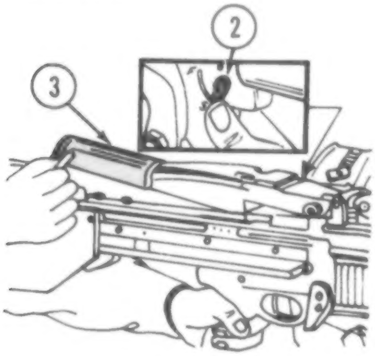
OPERATING THE M60 MACHINEGUN

UNLOADING THE M60 MACHINEGUN

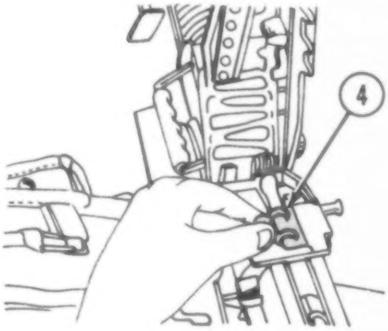
To unload the machinegun, proceed as follows:

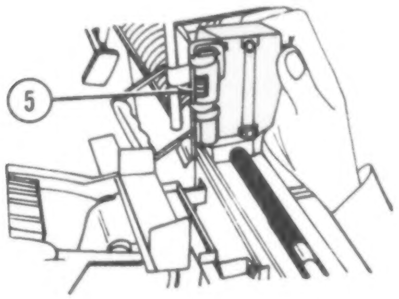
1. Charge gun by pulling cocking handle slide assembly to the rear (1).



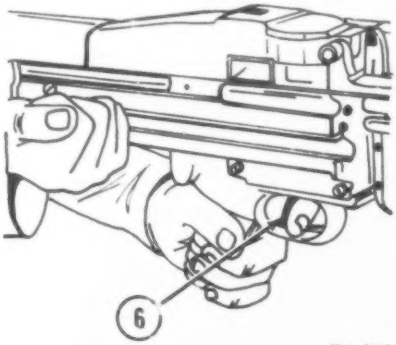


2. Turn safety to S (safe) (2).
3. Open cover (3)
4. Remove last link (4).
5. Raise feed tray (5), and see if chamber is clear.





6. Lower tray, close cover, and turn safety to F (fire).
7. Hold cocking handle slide assembly, press trigger (6), and slowly release handle forward.



TA 070929

OPERATING THE M60 MACHINEGUN

FIRING MALFUNCTIONS

Misfire, Hangfire, and Cookoff. Due to the possibility of a hangfire or cookoff after a misfire, the following procedures, as applicable, will be followed until the round has been removed from the weapon and the cause of failure determined.

1. Keep the bolt closed for the first five seconds due to the possibility of a hangfire.

2. Keep the weapon trained on the target.

3. Keep all personnel clear of the muzzle and wait five seconds.

4. After five seconds, raise cover and remove ammunition belt from the feed tray. Close cover immediately.

5. Pull cocking lever to rear, making sure that sear engages sear notch in operating rod.

6. During retraction of bolt, see if round is extracted and ejected.

7. If the round is not extracted, make one additional attempt to fire by pulling the trigger. Wait at least five minutes (with the bolt in the closed position). Retract the bolt and remove round by standing to one side of barrel, inserting cleaning rod into front of barrel and pushing round out of chamber.

Ruptured Cartridge Case. On rare occasions the front part of the case remains in the chamber and only the rear part is extracted. This kind of rupture is hard to spot since the gun will continue to function and will feed a new round into the chamber. Such a malfunction can result in the following:

1. Incomplete chambering of the next round, since the round being fed into the chamber cannot be fully seated. It may be compressed sufficiently to cause detonation with possible damage to the weapon, injury to personnel, or both.

2. A round driven into the ruptured case without detonation. If this happens remove the round as follows:

   a. Place Cleaning Rod, part number 6508237, into the muzzle end of barrel until it touches obstructed cartridge. Tap rod gently with hand and remove cartridge and stuck case fragment.

OPERATING THE M60 MACHINEGUN

b. If the ruptured case is lodged in the chamber, place Ruptured Cartridge Case Extractor, part number 7790352, completely through case in chamber. Insert Cleaning Rod, part number 6508237, into muzzle end of barrel, and, by tapping lightly with hand, remove case.

c. When round is extracted, examine primer:

(1) If primer is indented, keep round separate from other rounds until disposed of.

(2) If primer is not indented, examine gun to determine cause of malfunction, and correct as necessary.

Double Feed. A double feed occurs when a round is fed into a chambered spent case or live round. Clear a double feed as follows:

WARNING

Double feed can cause gun to fire out of battery and cause injury to personnel and damage to gun.

1. Clear gun of ammunition (except round in chamber). Lock bolt in rearward position and push safety to S (safe).
2. Stand to one side of barrel, and insert Cleaning Rod, part number 6508237, into barrel.
3. Push unfired round out of chamber.

DISMOUNTING THE M60 MACHINEGUN AND MACHINEGUN MOUNT

1. Push down on machinegun mount latch and lift machinegun from machinegun mount.
2. Loosen handle and lift pintle of machinegun mount from socket of pintle mount.

CAUTION

Turret cannot be traversed with pintle mounted and no machinegun mounted.

3. Perform maintenance on machinegun in accordance with FM 23-67.

TA 070931

OPERATION OF SMOKE GRENADE LAUNCHER

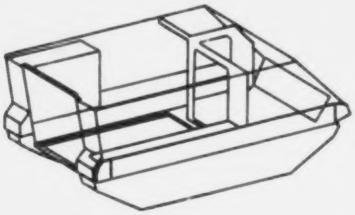
WARNING

Do not stand in front of loaded grenade discharger.

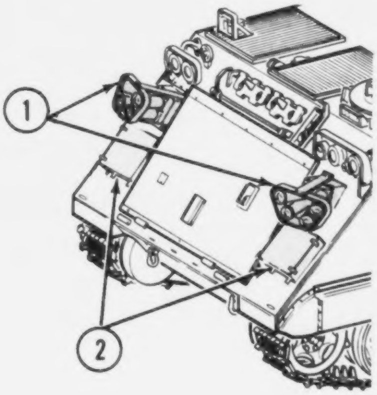
Do not place any part of the body other than hands in front of dischargers while loading or unloading dischargers.

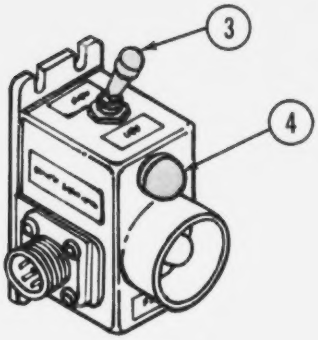
Keep the ARM/OFF switch in OFF until ready to fire.

LOADING THE GRENADE LAUNCHER DISCHARGERS (1) AND STOWAGE BOXES (2)



1. Check to make sure that the grenade launcher ARM/OFF switch (3) is in the OFF position and the power-on lamp (4) is not lit.





2. Remove rubber covers from tubes and check that tubes are free of foreign matter. Save covers for later use.

3. Remove eight smoke grenades from shipping containers to load into the dischargers.

TA 157910

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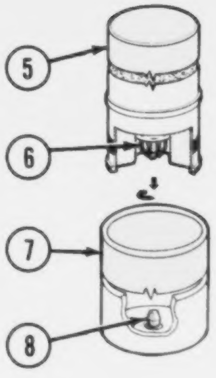
OPERATION OF SMOKE GRENADE LAUNCHERS

4. Insert a smoke grenade (5) into each tube (7). With palm of hand push grenades down, base first, so that spring clip (6) at base of each grenade engages tip plug (8) at bottom of tube. Rotate each grenade about 1/2 turn to insure electrical contact.



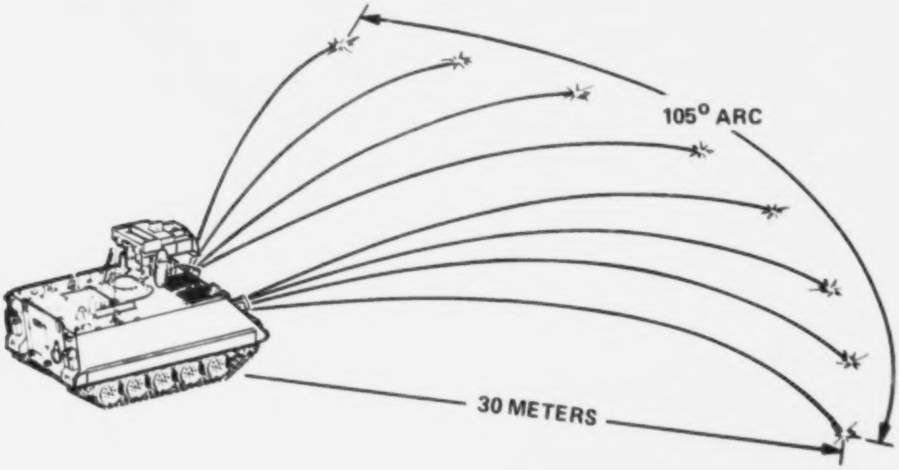
5. Load four spare grenades into each grenade stowage box. Be sure to close and lock the cover.

6. Retain empty shipping containers.

FIRING SMOKE GRENADES

WARNING

Before firing, make sure there are no obstacles directly in front of the vehicle.



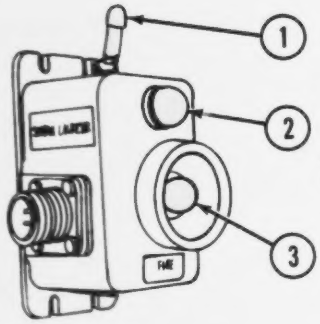
1. Point front of vehicle directly at area where smoke is desired to conceal the maneuver of the vehicle from enemy observation.

TA 157911

OPERATION OF SMOKE GRENADE LAUNCHERS

2. Place SMOKE LAUNCHER ARM/OFF switch (1) to ARM. (Power-on indicator (2) should light.)

3. Press FIRE switch (3) when ready to fire. When FIRE switch is pressed, 8 grenades will detonate around a 105-degree arc, 30 meters (98 feet) from the vehicle. The smoke cloud will be approximately 9 meters (30 feet) high and will last about 1 to 3 minutes, depending on wind.



4. To reload, ensure ARM/OFF switch (1) is off and power-on indicator (2) is not lit. Ensure all discharger tubes are clear. If grenades are still in discharger, refer to misfire procedures on page 2-173. If discharger tubes are clear, reload using grenades in stowage boxes on front of vehicle.

MISFIRES

A misfire is the failure of a grenade to be launched from the grenade discharger. When a misfire occurs, proceed as follows:

1. Make two more attempts to fire the grenade.

2. If the grenade still does not fire, ensure that the ARM/OFF switch (1) is off, the power-on indicator (2) is not lit, and the grenade is firmly seated.

3. If the grenade is not firmly seated, load properly, position the ARM/OFF switch to ARM, and attempt to fire the grenade.

4. If the grenade will not fire when firmly seated, attempt to fire the grenade from another discharger tube. If the grenade fires, notify organizational maintenance of a defective discharger.

5. If grenade still does not fire, treat as a dud.

TA 157912

OPERATION OF SMOKE GRENADE LAUNCHERS

DUDS

WARNING

Do not attempt to move a dud grenade.

In a training situation when a grenade fails to ignite after being launched, wait 15 minutes; then notify EOD personnel. Give type, quantity, and precise location of dud.

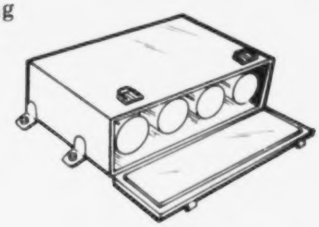
UNLOADING THE SMOKE GRENADE LAUNCHER DISCHARGERS AND STOWAGE BOXES

WARNING

Do not remove misfired grenades under these procedures. Use procedures for misfires on page 2-173.

Ensure that grenade launcher ARM/OFF switch is in the OFF position and the power-on indicator is not lit before unloading grenades from a discharger. Never place any part of the body other than hands in front of the discharger when unloading grenades.

1. Make sure grenade launcher power-on light is off.
2. Remove grenades from dischargers and vehicle stowage boxes and place in ammunition shipping containers.
3. Place rubber covers on empty launch tubes, and close vehicle stowage boxes.
4. Secure grenades in accordance with unit SOP.



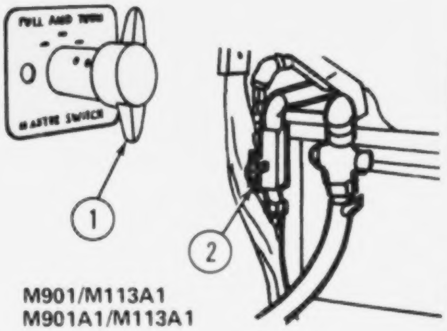
TA 157913

PERSONNEL HEATER

The personnel heater, mounted in the right front corner of the personnel compartment, heats and circulates the air in the vehicle. The control box is mounted behind the driver on the left wall.

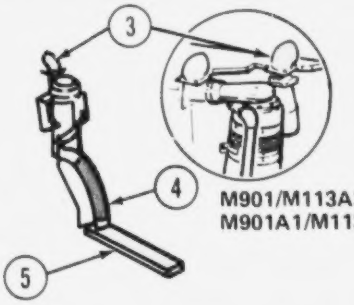
STARTING AND OPERATING PROCEDURES

1. Make sure the vehicle MASTER SWITCH (1) and the fuel shutoff valve (2) on the main fuel tank are on (except on later M901/M113A1 and M901A1/M113A1 chassis and all vehicles with M901/M113A2 and M901A1/M113A2 chassis that have heater circuits wired directly to battery).



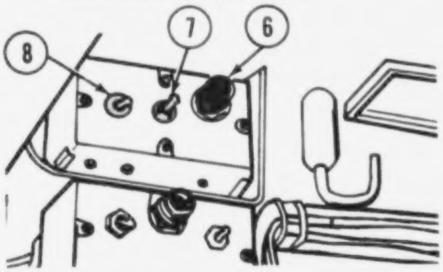
M901/M113A1
M901A1/M113A1

2. Inspect the heater to make sure that the heater exhaust (3) is open and not blocked, and that there are no fuel leaks. Make sure flexible tube (4) and outlet duct (5) are in place.



M901/M113A2
M901A1/M113A2

3. Press the indicator light (6). If the light glows, power is supplied to the heater controls. If the light does not glow, troubleshoot the heater (page 3-15).



4. Hold the RUN/OFF/START switch (7) to START until the indicator light (6) comes on. Then move the switch to RUN without stopping in the OFF position.

5. Select high or low heat with the HI-LO switch (8). The heater will always start on low heat no matter how the HI-LO switch is set, and will go to high after it starts if the switch is at HI.

NOTE

When using DF-2 fuel, set the HI-LO switch to HI and run for 1 to 3 minutes before switching to LO. If operating the heater for an extended time, start the engine periodically to keep batteries charged.

6. If the heater doesn't start, wait five minutes then try again. If it doesn't start in three tries, troubleshoot it (page 3-15).

TA 159214

PERSONNEL HEATER

SHUTDOWN AND PURGING PROCEDURE

WARNING

On early model vehicles with M901/M113A1 and M901A1/M113A1 chassis only, leave the MASTER SWITCH ON until the blower stops running and the indicator light goes out. If heater stops without letting it purge itself of fuel, fire or explosion could result the next time it is started.

To turn the heater OFF (except on later vehicles with M901/M113A1 and M901A1/M113A1 chassis and all vehicles with M901/M113A2 and M901A1/M113A2 chassis that have heater circuits wired directly to battery), just move the RUN/OFF/START switch to OFF. (The heater will stop burning right away.) Ensure the indicator light stays on and the blower runs until the heater cools off.

TA 159215

DRIVER'S WINDSHIELD KIT

The driver's windshield kit is to be used to protect the driver when operating in cold and wet weather.

INITIAL INSTALLATION

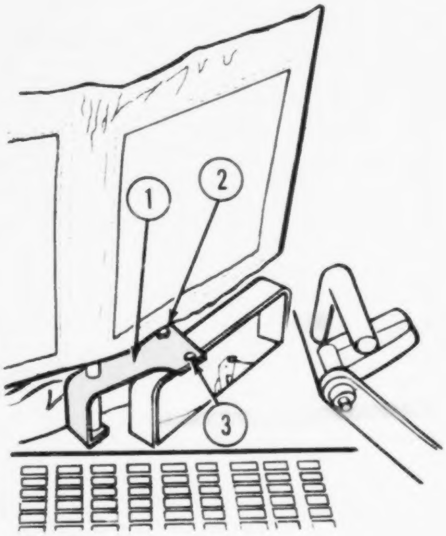
NOTE

Use care in handling windshield to avoid damage and scratches to windows.

1. Position windshield over periscope guards.

CAUTION

Outer screws (3) must be installed with heads down to prevent periscope vision interference, and inner screws (2) must be installed with heads up to prevent windshield interference.



2. Position windshield with mounting brackets (1) attached to tops of five periscope guards, position five plates under guards, aline hole, and secure with 10 screws and nuts.
3. Tuck skirt of windshield down between the hatch ring and periscopes.

REMOVAL AND REPEATED INSTALLATION

NOTE

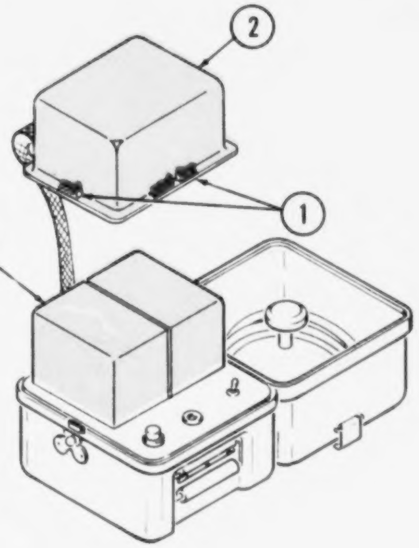
Mounting hardware may be left installed on periscope guards after initial installation.

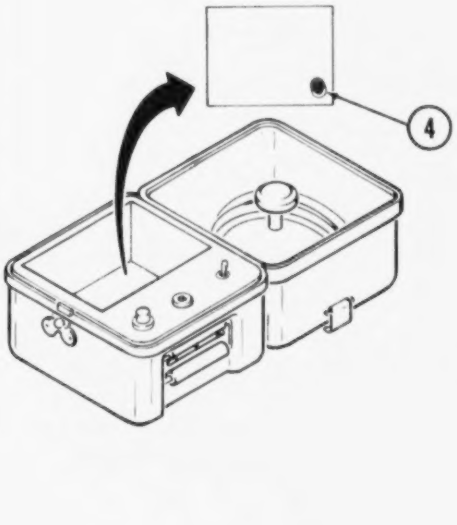
1. Grasp windshield firmly with both hands and pull straight up to remove.
2. Line up windshield rods with holes in brackets and push down to install. Windshield is secured to brackets by a friction spring in each bracket.

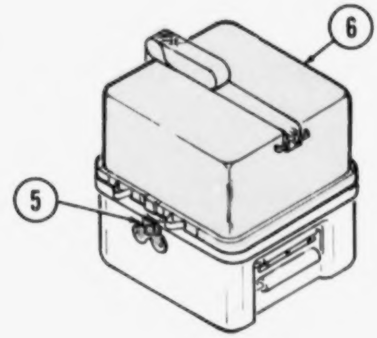
TA 159218

NIGHTSIGHT BATTERY POWER CONDITIONER BATTERY (M901A1)

REMOVAL AND REPLACEMENT OF BATTERY IN NIGHTSIGHT POWER CONDITIONER







TA 159216

WARNING

The lithium batteries used in this equipment are potentially hazardous if misused or tampered with before, during, or after discharge. The following precautions must be strictly observed to prevent possible injury to personnel or damage to equipment.

Do not heat, incinerate, crush, puncture, disassemble, or mutilate the battery.

Do not short circuit.

Do not store in equipment during long periods of unuse (in excess of 30 days).

Turn off equipment immediately if the battery compartment becomes unduly hot or rapidly increases in temperature, if the battery is venting (hissing sound) or if it has the smell of irritating sulfur dioxide gas. Remove and dispose of the battery only after it is cool (cool to touch).

Do not use carbon dioxide extinguishers on exposed lithium metal fires. Flood the burning material with water or use graphite type compounds or extinguishers to extinguish the burning lithium.

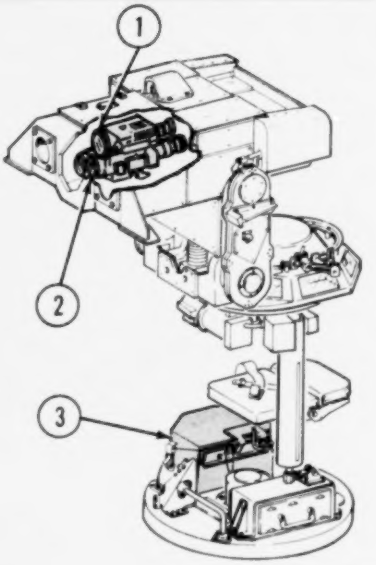
1. To remove battery, unlatch case lid and open. Slide the six battery cover latches (1) to unlatched position and remove battery cover (2). Remove battery (3).
2. To replace battery, insert battery (3) terminals into mating connector (4), and press down on battery (3). Install battery cover (2) and latch six latches (1). Close battery case lid (6) and secure latch (5).

TA 159217

OPERATION OF DISMOUNTED TOW SYSTEM

NOTE

Throughout this procedure the TOW system is illustrated with the AN/TAS-4 nightsight, the AN/TSQ-102 Missile Guidance Set (MGS) and the M53 traversing unit. Procedures for using the nightsight, MGS, and traversing unit are only slightly different. These differences are pointed out as they occur. The new nightsight, MGS and traversing unit are illustrated below.



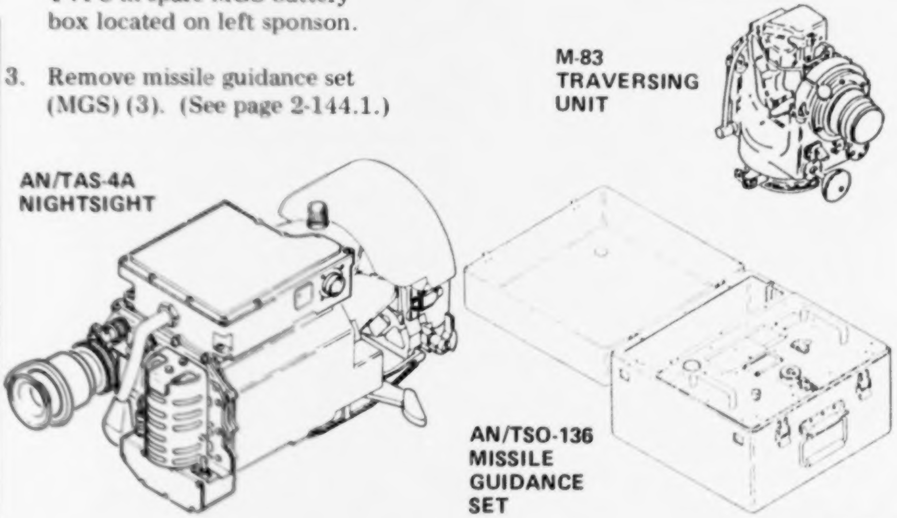
Components of the TOW system can be removed from the vehicle and assembled for ground (dismounted) firing using the following procedures. For a more detailed discussion of the basic TOW system refer to TM 9-1425-470-12 and TC 23-23.

DISMOUNTING TOW SYSTEM

1. Remove nightsight (1) and day-sight/tracker (2). (See pages 2-143 and 2-144.)

2. Remove TOW Vehicle Power Conditioner (TVPC) from MGS (See page 2-144.2). Install MGS spare battery in MGS (See page 3-59). Store TVPC in spare MGS battery box located on left sponson.

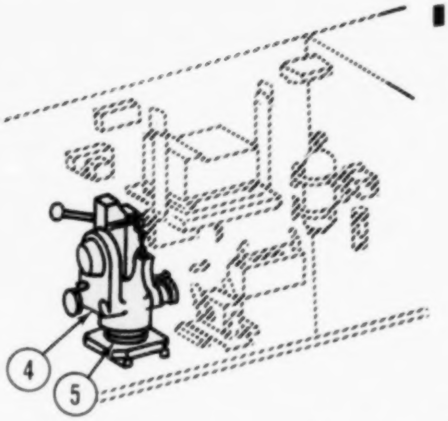
3. Remove missile guidance set (MGS) (3). (See page 2-144.1.)

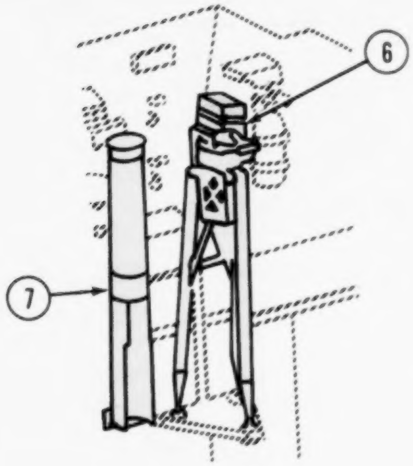


TA 159219

OPERATION OF DISMOUNTED TOW SYSTEM

4. Remove traversing unit (4) from stowed position on left side hull by releasing coupling clamp (5).





5. Remove tripod assembly (6) from stowed position in right rear of vehicle by unbuckling holddown straps.
6. Remove launch tube (7) from vehicle stowed position on right inside hull by unbuckling holddown straps.

SELECTION OF SITE

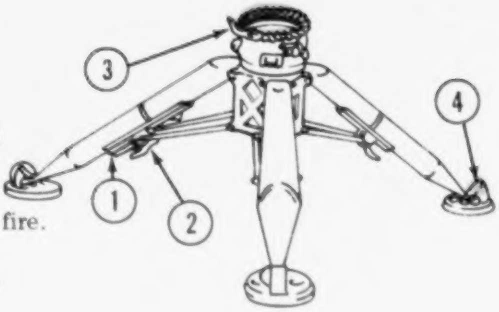
Select a launch site where the launcher will not slant sideways more than 10 degrees. Proper adjustment of the tripod legs will make up for uneven ground (up to a maximum slope of 30 degrees). Therefore, the site selected for ground emplacement of the TOW weapon system must not slope more than 40 degrees. The site must provide adequate field-of-fire of the target area and adequate back blast clearance. Components of the TOW system may be carried to launch site using Strap Assembly 10679923.

> **NOTE**
>
> **On the M901 system, the nightsight batteries and coolant cartridges are required for dismounted operation of the TOW system.**

SETTING UP THE TRIPOD

1. Make sure leg lock handles (1) are in the released position (handles pointing up). Open tripod by pulling outward on each tripod leg while pushing detent stop lever (2) in (toward tripod leg).

TA 159220



2. Pull leg lock handles (1) down to lock legs at desired detent position.

3. On sloping terrain, adjust tripod legs to level launcher as follows:

   a. Place one leg in direction of fire.

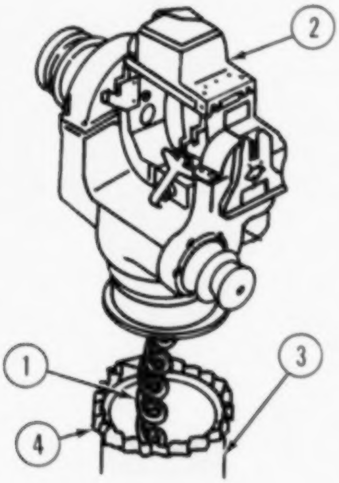
   b. Adjust downhill legs to level tripod.

   c. Tighten leg lock handles.

4. Force tripod anchor claws (4) into ground to make a firm base.

5. Release coupling clamp (3) to allow mounting of traversing unit.

INSTALLING THE TRAVERSING UNIT



CAUTION

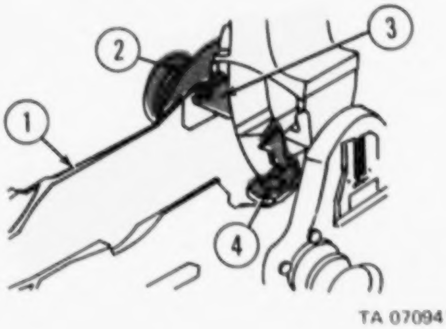
Do not allow dirt or other foreign matter to accumulate in connector end of coil cord.

1. Pass connector end of coiled cord (1) through body of tripod (3).

2. Center traversing unit (2) over tripod (3) to mate with tripod, and secure in place using coupling clamp (4).

INSTALLING THE LAUNCH TUBE

Place launch tube (1) on traversing unit (2), making sure launch tube retaining studs (3) are inserted in the slots of the launch tube bracket on the traversing unit. Secure with launch tube latch (4).



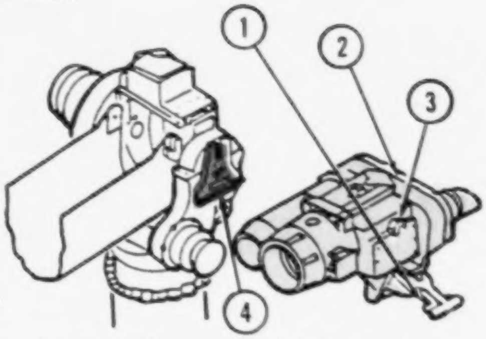
TA 070941

OPERATION OF DISMOUNTED TOW SYSTEM

INSTALLING THE DAYSIGHT/TRACKER

CAUTION

Handle daysight/tracker with care. It is a precision device and contains fragile components.



1. With latch assembly (1) all the way down, aline daysight/tracker (2) with index plate (4) on traversing unit, then secure daysight/tracker by lifting up on latch assembly.

2. Check lens for cleanliness and damage, and make sure RETICLE LIGHT switch (3) is set to OFF.

INSTALLING NIGHTSIGHT

1. Move latch handle (1) to rear (unlocked) position.

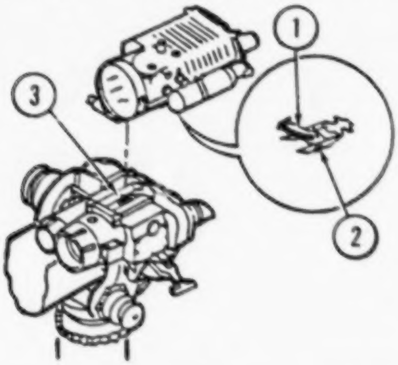
2. Aline cam post (3) on top of daysight/tracker with keyed hole (2) on bottom of nightsight and lower nightsight down over daysight/tracker.

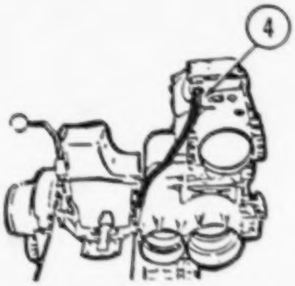
3. Move latch handle to forward (locked) position.

CAUTION

Do not lift TOW 2 nightsight by post amplifier cable.

4. On ground TOW 2 system, remove nightsight cable from holding cup on traversing unit and connect to post amplifier connector (4) on nightsight.



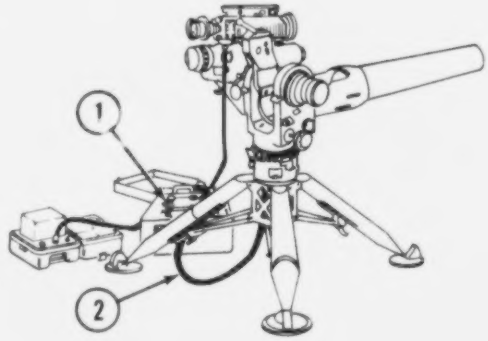


5. On ground TOW 2 system, connect battery power conditioner cable to connector J1 of nightsight.

TA 159221

OPERATION OF DISMOUNTED TOW SYSTEM

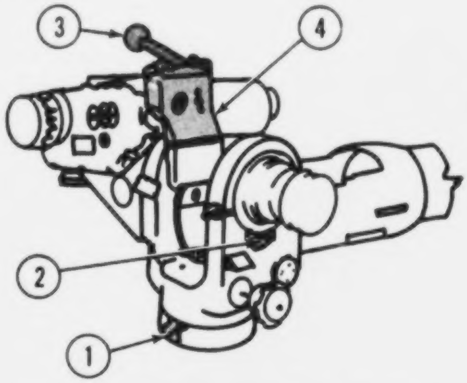
SETTING UP MISSILE GUIDANCE SET



1. Place MGS near base of tripod where it will not interfere with loading and firing operations.
2. Connect coil cord (2) to electrical connector J1 on MGS (1). To insure proper seating, aline colored index line on coil cord connector with index line on MGS.
3. If equipped with unimproved ground TOW system, perform MGS self-test (see page 2-148, this TM) and check and aline nightsight (if installed). (See page 2-153.)
4. If equipped with ground TOW 2 system, perform system checkout in accordance with procedure on page 2-156.2.

LOADING THE LAUNCH TUBE

1. Make sure that the azimuth lock (1) and elevation lock (2) on traversing unit are locked. Raise locking handle (3), and bridge clamp (4).



WARNING

DO NOT stand directly behind or in front of the launch tube during or after encased missile loading. Never point loaded weapon system in direction of friendly troops or their equipment.

CAUTION

Use care not to puncture the encased missile diaphragm when the forward handling ring is removed.

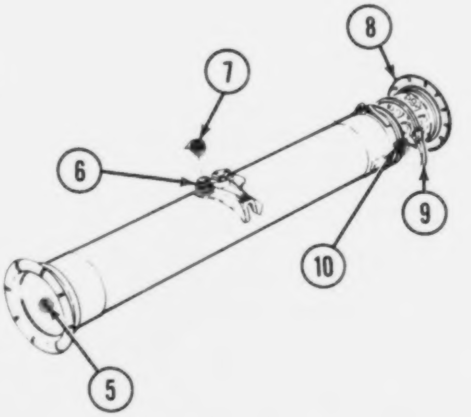
NOTE

Save forward handling ring, connector cover, and quick release clamp for reuse in case the missile is not fired.

TA 159222

OPERATION OF DISMOUNTED TOW SYSTEM

2. Remove encased missile from its stowed position; check humidity indicator (5) in aft end of encased missile to insure that it is not pink; remove quick release clamp (9) and forward handling ring (8). Check diaphragm to make sure that it is not ruptured. Missiles with pink indicators or ruptured diaphragms should be returned to the ammunition supply point. (Missiles may be fired if diaphragm was ruptured during the immediate operation.)

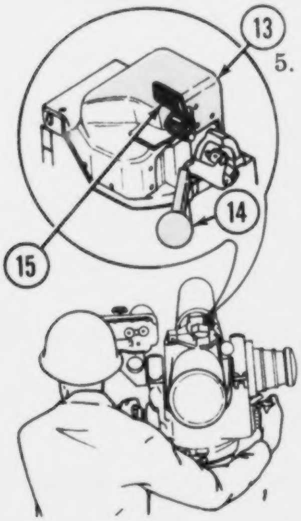


3. Remove electrical connector protective cover (7) from the launch container.

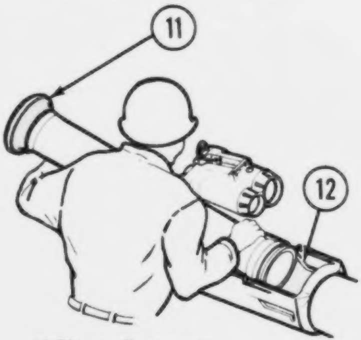
WARNING

To prevent accidental firing of the missile, do not raise arming lever (15) (to make electrical connections to the encased missile) until ready to engage selected target.

4. With electrical connector (6) facing up, insert indexing lugs (10) into launch tube indexing slots (12), and slide encased missile forward and down until lugs are seated firmly.



5. Lower aft end (11) of encased missile and insure that it is properly indexed so that electrical connector will mate with bridge clamp.



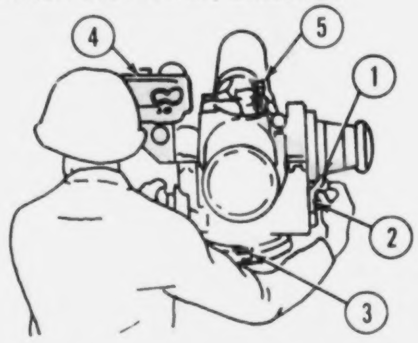
6. Lower bridge clamp (13), and secure encased missile in launch tube by applying downward pressure to top of bridge clamp and pulling bridge clamp locking handle (14) to locked position.

TA 070944

OPERATION OF DISMOUNTED TOW SYSTEM

ACQUIRING AND TRACKING TARGET WITH DAYSIGHT/TRACKER

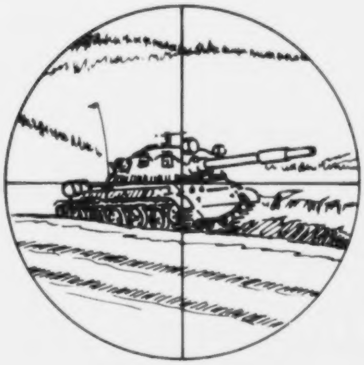
1. Release AZIMUTH (3) and ELEVATION (1) locks, then, using control knobs, position traversing unit to aline optical sight (nightsight) in general direction of selected target.



WARNING

Make sure personnel are clear of backblast danger zone. Injury can result from backblast.

2. Raise trigger protective cover (2).



3. Raise arming lever (5). Encased missile is now electrically connected to launcher and is ready to fire.
4. If needed, set RETICLE LIGHT switch on daysight/tracker (4) to ON.
5. Adjust focus control on daysight/tracker eyepiece until crosshairs are seen clearly.
6. Use AZ and EL control knobs to aline and keep crosshairs centered on selected target.
7. Fire on command of the squad leader.
8. Keep tracking the target until missile impacts. (See page 2-163 for firing malfunctions.)

ACQUIRING AND TRACKING TARGET WITH NIGHTSIGHT

1. Make sure front lens cover is removed from nightsight.

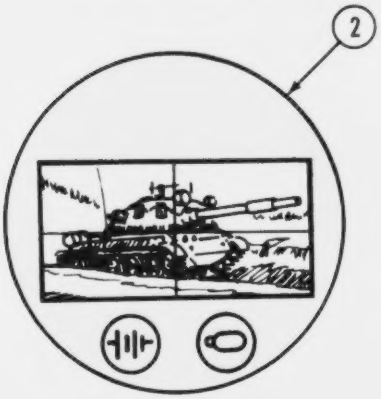
2. On unimproved TOW, make sure actuator is set to ON and pressure indicates 1000 psi or above.

2.1 On TOW 2, make sure ON/OFF/STBY switch is ON.

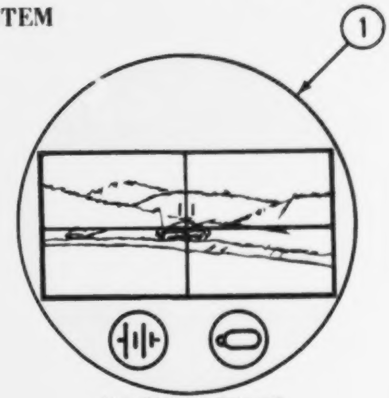
TA 159223

OPERATION OF DISMOUNTED TOW SYSTEM

3. Sight through eyepiece, and adjust diopter adjustment ring to focus crosshairs.
4. Select wide field-of-view and acquire target (sight picture 1).



(AN/TAS-4 ONLY)



(AN/TAS-4 ONLY)

5. Select narrow field-of-view (sight picture 2) and adjust range FOCUS, CTRS, and BRT controls as necessary.
6. Use traversing unit control knobs to aline and keep crosshairs centered on target.
7. Fire on command of the squad leader.
8. Keep tracking the target until missile impacts. (See page 2-163 for firing malfunctions.)

UNLOADING LAUNCH TUBE

1. Unload launcher as follows if missile was fired:

   a. Lower trigger protective cover.

CAUTION

Do not depress trigger with expended launch container in launch tube. Potential shorts can damage the prefire, fire, and wire-cutter circuits.

   b. Lock azimuth and elevation locks on traversing unit.

NOTE

Do not set arming lever to SAFE prior to opening bridge clamp. Command-link wires will not be cut.

TA 159224

(c) Open bridge clamp. This action automatically cuts command-link wires; forces arming lever down to electrically disconnect launcher from empty launch container, and turns launcher off.

(d) Remove empty launch container from launch tube.

(e) Check launch tube bore and breech for foreign material. Pull command-link wires out of front end of launch tube if they did not drop out when they were cut.

WARNING

Exercise care. Command-link wires are extremely small and strong and could cause injury if improperly handled.

2. Unload launcher as follows if missile was not fired:

   (a) Check trigger to insure that protective cover is lowered.

   (b) Make sure that AZIMUTH and ELEVATION locks on traversing unit are locked.

   (c) Lower arming lever to SAFE position.

   (d) Open bridge clamp.

   (e) Remove encased missile from launch tube.

   (f) Replace protective cover on electrical connector.

   (g) Replace forward handling ring and clamp on launch container.

   (h) Secure encased missile in stowage rack.

3. See page 2-163 for firing malfunctions.

TA 070947

OPERATION OF DISMOUNTED TOW SYSTEM

DISASSEMBLY OF DISMOUNTED TOW SYSTEM

To disassemble the dismounted TOW system, proceed as follows:

1. Lock azimuth and elevation locks on traversing unit.
2. Remove nightsight from daysight/tracker.

> **CAUTION**
>
> **Daysight/tracker may fall if not properly supported while being unlatched.**

3. Remove daysight/tracker from traversing unit.
4. Disconnect coil cord from missile guidance set, and make sure that coil cord connector does not come in contact with ground. (Return to inside of traverse unit.)
5. Release launch tube latch, and remove launch tube.
6. Disengage coupling clamp, and remove traversing unit; check coil cord to make sure that it is in good condition, then secure coil cord connector in cup at bottom portion of traversing unit.
7. Unlock leg lock handles, grasp top of tripod, and raise it above the ground. Tripod legs close automatically.
8. Make sure that tripod anchor claws are in the up position.
9. Inspect, clean, and stow weapon system components in vehicle. (See stowage plan, appendix F.)

TA 157917

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

CAUTION

During normal operation, monitor BATTERY GENERATOR indicator on driver's instrument panel. If indicator indicates in red sector while turret is operating, stop operation and start engine. Idle engine at 1000 rpm. Note that indicator returns to green sector.

MGS SELF-TEST (M901)

Conduct self-test on MGS for position 1 and positions 3 through 6 as follows:

NOTE

Positions 2 and 7 of MGS self-test will be performed later in the operational checkout.

If the TOW vehicle power conditioner (TVPC) is installed, make sure that power switch on TVPC is set to ON.

1. Set vehicle MASTER SWITCH to ON.
2. Set SELF-TEST switch to position 1.
3. Lift the cover on the TEST/OPERATE switch.
4. Hold the TEST/OPERATE switch in the TEST position and proceed as follows:
    a. Check that ELEVATION and AZIMUTH meters on MGS read.within in-band marks and that meter lights come on.

    b. Set the SELF-TEST switch to position 3 and check that ELEVATION and AZIMUTH meters read within in-band marks.

    c. Set the SELF-TEST switch to position 4 and check that ELEVATION and AZIMUTH meters read within in-band marks.

    d. Set the SELF-TEST switch to position 5 and check that ELEVATION and AZIMUTH meters read within in-band marks within 12 seconds.

TA 159225

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

NOTE

For proper operation, the AZIMUTH meter should read extreme left for approximately 8 to 12 seconds after setting the SELF-TEST switch to position 5. The meter should read within the in-band marks. The ELEVATION meter should go through the following cycles: extreme left, then to within in-band marks, back to extreme left, then to within in-band marks where it shall remain.

   e. Set the SELF-TEST switch to position 6 and check that ELEVATION and AZIMUTH meters read within in-band marks.

   f. Recheck position 1 of the SELF-TEST switch.

5. Release the TEST/OPERATE switch.

6. Lower the cover on the TEST/OPERATE switch.

MGS SELF-TEST AND TOW SYSTEM CHECKOUT (M901A1)

Perform MGS self-test and TOW system checkout procedure on page 2-156.2.

HATCHES

1. Close the cargo hatch as follows:
   a. Grasp release knob.
   b. Pull knob down and slide it inward to release detent catch.
   c. Release knob.
   d. Grasp strap.
   e. Pull down to close hatch.
2. Close the gunner's hatch as follows:
   a. Grasp strap.
   b. Hold hatch open with hand grasping strap.
   c. Push handle to release hatch from locked position.
   d. Pull strap to close hatch.
   e. Secure hatch by pulling down on combat latch.
3. Close the driver's hatch as follows:
   a. Grasp fixed handle with right hand.

TA 159226

b. Grasp hatch release handle ("T" handle) with left hand and pull down.

c. Pull hatch down with right hand.

d. Release "T" handle.

NOTE

If the hatch locks in the pop-up position, pull down on the "T" handle again.

e. Grasp locking knob with left hand.

f. Pull locking knob down and slide toward the center of the hatch.

g. Pull down on fixed handle.

h. Slide locking knob to release position and release.

i. Grasp latching handle with left hand.

j. Pull latching handle down to lock hatch.

k. Release fixed handle and latching handle.

GUNNER'S CONTROL PANEL INITIAL CHECK

1. Check the gunner's control panel to make sure switches are set as follows:

Switch	Position
TURRET POWER	OFF
MODE SELECT	STOW
ERECTION DRIVE	OFF
EMER PWR	OFF
OVERRIDE	OFF
MISSILE SELECT	OFF
ARMED/SAFE	SAFE

2. Make sure that the cover on the OVERRIDE switch is secured with wire.

LAMP TEST

1. Make sure that MASTER SWITCH is set to ON.

TA 157920

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

2. Hold LAMP TEST switch down. The following lights should come on:

    LAUNCHER ERECT
    LAUNCHER READY
    AZ LOAD
    ELEV LOAD
    LOAD POSITION
    AZ STOW
    ELEV STOW
    STOW POSITION
    CARGO HATCH
    WPN HATCH
    DRIVER HATCH
    FIRE INTRPT
    LEFT ARMED
    RIGHT ARMED
    LEFT SEL
    RIGHT SEL

3. Turn DIM/BRT knob counterclockwise (left) — lights should dim.

4. Turn DIM/BRT knob clockwise (right) — lights should brighten.

5. Release LAMP TEST switch.

6. Push in the TURRET POWER light. Light should come on.

7. Set TURRET POWER switch to the ON position. The following lights should come on:

    TURRET POWER
    AZ STOW
    ELEV STOW
    STOW POSITION

8. Push in the READY TO LOAD light on the fire interrupt/intercom assembly. Light should come on.

ERECTION OF LAUNCHER

NOTE

The launcher can be erected using battery power, but it is better to start the engine to avoid draining the batteries.

1. Set the MODE SELECT switch to the ERECT position.

TA 157921

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

2. Hold the ERECTION DRIVE switch in the ON position and watch the indicators on the gunner's control panel.

3. Release the ERECTION DRIVE switch when the LAUNCHER READY light comes on.

4. Make sure that the following indicators are on:

   LAUNCHER ERECT
   LAUNCHER READY
   AZ STOW
   EL STOW

TRAVERSING OF TURRET

CAUTION

When traversing the turret or elevating and depressing the launcher, stop turret or launcher movement by returning the hand grips on the gunner's hand controls to the neutral position. DO NOT stop turret or launcher movement by releasing the action switches since damage to the system can occur.

1. Grasp the hand grips on the gunner's hand controls.

2. Without squeezing the action switches, turn the hand grips to the right (like steering a car).

3. Without squeezing the action switches, turn the hand grips to the left.

NOTE

The turret may or may not traverse. Operation is normal if the turret does not traverse or if the turret does traverse but sounds louder than usual.

4. Grasp the right-hand grip (only) on the gunner's hand controls.

5. Squeeze the action switch on the right-hand grip.

6. Turn the hand grip to the right.

TA 159227

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

NOTE

The farther the hand grip is turned, the faster the turret will traverse.

7. While turret is traversing (on M901 only) conduct system self-test for position 2 on the MGS as follows:
    a. Set the SELF-TEST switch to position 2.
    b. Lift the cover on the TEST/OPERATE switch.
    c. Hold the TEST/OPERATE switch in the TEST position.
    d. Watch the AZIMUTH meter on the MGS; the needle should move to the right as the gunner traverses right.
8. Return the hand grips on the gunner's hand controls to the neutral position.
9. Release the right action switch and hand grip.
10. Grasp the left hand grip (only) on the gunner's hand controls.
11. Squeeze the action switch on the left hand grip.
12. Turn the hand grip to the left.
13. While turret is traversing (on M901 only) continue self-test on position 2 by holding MGS TEST/OPERATE switch in the TEST position and watching the AZIMUTH meter on the MGS; the needle should move to the left as the gunner traverses left.
14. Return the hand grips on the gunner's hand controls to the neutral position, then release the action switch.

ELEVATION AND DEPRESSION OF LAUNCHER

1. Grasp the hand grips of the gunner's hand controls.
2. Squeeze the action switches.
3. Rotate the handgrips rearward until the launcher reaches maximum elevation.
4. While launcher is elevating (on M901 only) continue position 2 self-test by holding MGS TEST/OPERATE switch to TEST position and watching the ELEVATION meter on the MGS; the needle should move to the right as the gunner elevates the launcher.

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

5. Rotate the handgrips forward while squeezing the action switches until launcher reaches maximum depression.
6. While launcher is depressing (on M901 only) continue position 2 self-test by holding the MGS TEST/OPERATE switch to TEST position and watching the ELEVATION meter on the MGS; the needle should move to the left as the gunner depresses the launcher.
7. Return the hand grips on the gunner's hand controls to the neutral position, then release the action switches.
8. Release the TEST/OPERATE switch on the MGS.
9. Lower the cover for the TEST/OPERATE switch.
10. Set SELF-TEST switch to unmarked position.

SLEWING OF TURRET

NOTE

When the slew switch is squeezed, the turret traverses four times faster than normal.

1. Traverse slowly to the right.
2. Squeeze the right slew switch on the hand grip. Speed of traverse should increase.
3. Return the hand grips to the neutral position.
4. Release the right slew switch.
5. Traverse slowly to the left.
6. Squeeze the left slew switch. Speed of traverse should increase.
7. Return the hand grips to the neutral position.
8. Release the left slew switch and the action switches.

TRIGGERS (M901)

NOTE

Check the gunner's control panel to see if the FIRE INTRPT light is on. If it is, correct the fire interrupt condition.

TA 159229

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

1. Press the trigger button on the right hand grip of the gunner's hand controls. The trigger light should come on.
2. Press the trigger button on the left hand grip of the gunner's hand controls. The trigger light should come on.
3. For triggers on M901A1, perform system checkout in accordance with procedures on page 2-156.2.

SLEWING OF TURRET TO LOAD POSITION

1. Slew the turret to 0 degrees in azimuth and elevate the launcher to maximum elevation.

NOTE

Direction of slew will depend on which way it is closer to get to 0 degrees in azimuth.

2. Watch the azimuth position indicator.
3. Slow turret slew speed by turning the hand grips toward the neutral position to within 20 degrees.
4. Release the slew switches (only) when you get close to 0 degrees (within 10-20 degrees), but continue to traverse.
5. Return the hand grips on the gunner's hand controls to the neutral position when the azimuth position indicator reaches 0 degrees.
6. Make sure the AZ LOAD light on the gunner's control panel is on.

NOTE

You might have to traverse the turret back and forth until it is in a position that allows the light to come on.

7. Make sure the ELEV LOAD light is on.
8. Set the MODE SELECT switch to the LOAD position.
9. Hold the ERECTION DRIVE switch in the ON position.
10. Watch the LOAD POSITION light on the gunner's control panel.
11. Release the ERECTION DRIVE switch when the LOAD POSITION light comes on.
12. Watch the READY TO LOAD light on the fire interrupt/intercom assembly. The light should come on when the launcher reaches the load position.

TA 159230

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

LAUNCH TUBES AND HATCH FIRE INTERRUPT CIRCUITRY

NOTE

On M901A1 system, steps 3 through 10 are performed in MGS self-test and TOW weapon system checkout and need not be repeated.

1. Open the cargo hatch to the first position as follows:
   a. Pull the rubber covered chain to release the interior latches.
   b. Push the cargo hatch up until it locks in the first position.
2. Watch the indicators on the gunner's control panel. The CARGO HATCH and FIRE INTRPT lights should come on.
3. Make sure the launch tubes are clear of debris.
4. Grasp the right missile locking handle.
5. Squeeze the detent on the locking handle.
6. Push the locking handle up to the open position.
7. Watch the right launcher indexing lug to be sure it moves to the open position (NOT sticking out).
8. Pull the right locking handle down to the closed (locked) position.
9. Watch the launcher indexing lug to be sure it moves to the closed position (sticking out).
10. Repeat steps 5 through 10 for the left launch tube.
11. Close the cargo hatch.
12. Watch the indicators on the gunner's control panel. The CARGO HATCH and FIRE INTRPT lights should go out.
13. Erect the launcher.
14. Depress the launcher to minimum elevation.
15. Open the gunner's hatch as follows:
   a. Pull out the hatch retainer handle.
   b. Push the hatch up (about 3 inches).
   c. Watch the indicators on the gunner's control panel. The WPN HATCH and FIRE INTRPT lights should come on.
16. Attempt to traverse the turret.

TA 159231

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

NOTE

The turret may or may not move. Operation is normal if the turret does not traverse or if the turret traverses but sounds louder than usual.

17. Close the gunner's hatch.

18. Watch the indicators on the gunner's control panel. The WPN HATCH and FIRE INTRPT lights should go out.

19. Open the driver's hatch as follows:

    a. Release the hatch latching handle.

    b. Push the hatch up (about 3 inches).

20. Watch the indicators on the gunner's control panel. The DRIVER HATCH and FIRE INTRPT lights should come on.

21. Attempt to traverse the turret.

NOTE

The turret may or may not move. Operation is normal if the turret does not traverse or if the turret does traverse but sounds louder than usual.

22. Close the driver's hatch.

23. Watch the indicators on the gunner's control panel. The DRIVER HATCH and FIRE INTRPT lights should go out.

24. Open the cargo hatch as follows:

    a. Pull the rubber covered chain down.

    b. Push the hatch up to the first stop.

25. Watch the indicators on the gunner's control panel. The CARGO HATCH and FIRE INTRPT lights should come on.

NOTE

The turret traverses normally with the cargo hatch open.

TA 157927

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

SELECTION AND ARMING OF MISSILES (M901)

1. Set MISSILE SELECT switch on the gunner's control panel to the LEFT position.

NOTE

The fire interrupt alarm should sound.

2. Raise the cover on the SAFE/ARMED switch.
3. Set the SAFE/ARMED switch to the ARMED position.
4. Watch the indicators on the gunner's control panel. The LEFT SEL and LEFT ARMED lights should come on.
5. Watch the launcher remote arming devices (RAD) from the open cargo hatch. The left RAD should come down.
6. Set MISSILE SELECT switch to the RIGHT position.
7. Watch the indicators on the gunner's control panel. The LEFT SEL and LEFT ARMED lights should go out. The RIGHT SEL and RIGHT ARMED lights should come on.
8. Watch the launcher RAD from the open cargo hatch. The left RAD should go up and the right RAD should come down.
9. Set ARMED/SAFE switch to SAFE.
10. LOWER the ARMED/SAFE switch cover.
11. Set the MISSILE SELECT switch to OFF.

NOTE

The fire interrupt alarm should stop.

12. Watch the indicators on the gunner's control panel. RIGHT SEL and RIGHT ARMED lights should go out.
13. Watch the RAD from the open cargo hatch. The right RAD should go up.
14. Close the cargo hatch.
15. Watch the indicators on the gunner's control panel. The CARGO HATCH and FIRE INTRPT lights should go out.

TA 159232

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

NOTE

On M901A1 system, steps 16 through 21 are performed in MGS self-test and TOW weapon system checkout and need not be repeated.

16. Hold the nightsight BRT (brightness) remote control switch up, then down. Brightness of the sight picture should vary.
17. Hold the nightsight CTRS (contrast) remote control switch up, then down. Contrast of the sight picture should vary.
18. Hold the nightsight FOCUS remote control switch up, then down. Focus of the target in the sight picture should vary.

NOTE

This control changes the focus very slowly. Allow enough time to make sure that the control is working.

19. Adjust FOCUS, BRT, and CTRS controls to get the clearest sight picture of the target.
20. Pull the FOV (field-of-view) remote control out. The field-of-view should change from wide to narrow.

NOTE

Focus should not change when switching from narrow field-of-view to wide field-of-view.

21. Push the FOV remote control in. The field-of-view should change from narrow to wide.
22. On M901 only, set the sight select switch to 13x and boresight the daysight/tracker as follows:
    a. Slew the turret to 180 degrees azimuth, if necessary.
    b. Depress the launcher to minimum elevation.
    c. Set SELF-TEST switch on the MGS to position 7.
    d. Hold the TEST/OPERATE switch in the TEST position.
    e. Watch the ELEVATION meter to determine band reading.
    f. Adjust the ELEVATION boresight knob on the daysight/tracker for a center/band reading on the ELEVATION meter.
    g. Watch the AZIMUTH meter on the MGS to determine band reading.
    h. Adjust the AZIMUTH boresight knob on the daysight/tracker for a center-band reading on the AZIMUTH meter.

TA 159233

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

i. Set the SELF-TEST switch to the straight up (unmarked) position.

j. Release the TEST/OPERATE switch.

23. On M901 only, collimate the nightsight as follows:

a. Install the battery on the collimator.

b. Align the battery connector with the guide pins and the power input connector on the collimator.

c. Turn the collimator locking handles up and in as far as the handles will go.

d. Attach the collimator to the mounting pads and guide pins on the nightsight.

e. Tighten the locking handles on the collimator by turning the handles downward to secure the collimator to the nightsight.

NOTE

Adjust the FOCUS, BRT, or CTRS controls if necessary.

f. Turn the sight select switch to NIGHT. Look through the eyepiece for sight picture.

g. Make sure that both the collimator reticle and daysight/tracker reticle can be seen clearly.

NOTE

Adjust the focus and/or turn on the daysight/tracker reticle light, if necessary.

h. Align the two reticles by adjusting the collimator elevation and azimuth knobs.

NOTE

Accuracy is very important. The small circle of the boresight collimator should be divided into four equal wedges by the daysight/tracker reticle.

i. Adjust boresight collimator elevation and azimuth adjustment knobs to bring reticle into perfect alignment with the daysight/tracker reticle sight picture.

TA 159234

TURRET AND FIRE CONTROL EQUIPMENT OPERATIONAL CHECKOUT

15. Make sure the gunner's control panel switches are set as follows:

Switch	Position
ARMED/SAFE	SAFE
MISSILE SELECT	OFF
OVERRIDE	OFF
EMER PWR	OFF
ERECTION DRIVE	OFF
MODE SELECT	STOW
TURRET POWER	OFF

TA 157935

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

GENERAL

This section covers the operation of the vehicle under extreme climatic conditions and under conditions of emergency. It also gives special instructions for crossing small bodies of water (swimming).

OPERATION IN EXTREME COLD

NOTE

If FRH hydraulic oil is used below temperatures of –15°F, the system may be sluggish until the hydraulic fluid warms up.

The vehicle must be specially prepared for operating in extreme cold (below –25°F). Even with antifreeze in it, coolant can freeze; so can batteries. Ordinary oil can get so thick it won't pour, and grease gets stiff. Bare skin can stick to cold metal so tight that the skin tears off getting free. Rubber gets hard, and cracks or breaks easily. Before trying to operate in extreme cold, make sure the vehicle has been prepared as described in TM 9-207. Also become familiar with FM 31-70, FM 31-71, and FM 31-72; they contain important information on operation in extreme cold.

CAUTION

Follow the approved methods and precautions for extreme cold operation. TM 9-207 is required reading. It contains information and instructions that must be used to operate this vehicle in extreme cold.

In addition to using special fuel, lubricants, and coolant in extreme cold, the vehicle should be equipped with an engine coolant heater kit. If it must be operated in extreme cold without this kit, drain the coolant and remove the batteries to a warm place every time the vehicle is shut down. Then preheat the engine before adding coolant and starting it. If the engine air intake and exhaust grille covers are not available, use tarpaulins to cover the grilles.

TA 159235

DO'S AND DON'TS

DO . . Be alert all the time for the effects of cold on the vehicle.

. . Keep an eye on the instruments all the time. If there is an unusual reading, stop and check it out right away.

. . Read TM 21-306 to learn about the methods and special hazards of driving on snow, ice, and unusual terrain in extreme cold.

. . Drive the vehicle slowly in 1 range for about 100 yards, before moving out, to warm up the lubricant in the drive train and suspension.

. . Park in shelter whenever possible. If there's no shelter, park so the vehicle doesn't face the wind.

. . Put on the engine air inlet and exhaust grille covers and start the engine coolant heater as soon as engine is stopped.

. . If unable to park in shelter, put a footing of planks or brush under the tracks so they won't get frozen in.

. . Clean off snow, ice, or mud as soon as possible.

. . Drain the fuel filters and fill the fuel tank, as soon as possible. Water forms in an empty fuel tank when it cools down, and water anywhere in the fuel system can freeze and block the system.

. . Keep the vehicle covered as much as possible. Use tarpaulins or anything available to protect the vehicle.

. . Cover the machinegun when it is not in use. Keep the gun clean and lightly lubed.

DON'T. . Leave the brakes locked when stopped. If water is present, it could freeze them in the locked position.

. . Let the ends of tarpaulins touch the ground. They could freeze in place.

STARTING ENGINE IN EXTREME COLD (BELOW --25°F)

1. Do the B preventive-maintenance checks and services.

2. If the vehicle has the engine coolant heater kit and the heater is used while the vehicle was parked, use the normal cold-weather starting procedures. If the vehicle doesn't have the engine coolant heater kit, or the heater stopped running and the vehicle is COLD, report it to organizational maintenance.

3. After the engine starts turn OFF the engine coolant heater and close the coolant shutoff valve. Then do the D preventive-maintenance.

TA 070950

OPERATION UNDER UNUSUAL CLIMATIC CONDITIONS

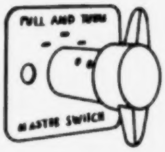
OPERATION OF THE ENGINE COOLANT HEATER

The engine coolant heater is a kit installed to prepare the vehicle for extremely cold temperatures. The kit heats coolant and circulates the heated coolant through the engine and a heat exchanger plate in the battery compartment. The engine coolant heater control box is mounted in the driver's compartment. Two manual shut-off valves in the power plant compartment allow for stopping the flow of coolant through the engine coolant heater when it's not running. Start and operate the heater as follows:

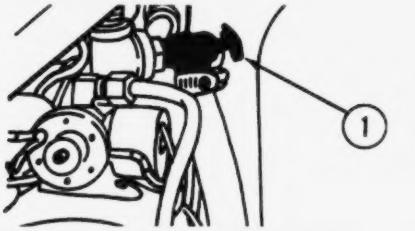
CAUTION

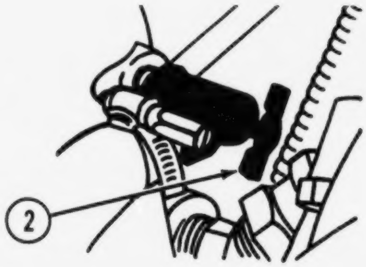
Do not operate the heater for an extended period of time if batteries are weak.

1. Make sure the MASTER SWITCH is ON.



2. Do the "before-operation preventive maintenance checks and services."
3. Open the shut-off valve (1) on top of the heater and the valve (2) between the engine and transmission by turning them counterclockwise as far as they will go.

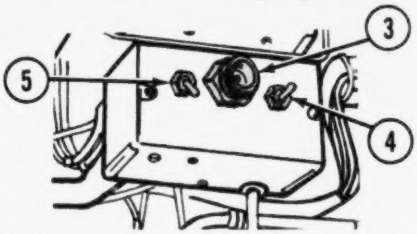




NOTE

The coolant shut-off valves should be opened only during operation of the engine coolant heater.

4. Press the indicator light (3). Power is on if the light glows.



CAUTION

Overheating will damage the batteries. Don't use the engine coolant heater if the temperature is above –25 degrees F. Make sure both manual shut-off valves are open before starting the heater. If the coolant doesn't flow, the heater will be damaged.

TA 070951

5. Hold the RUN/OFF/START switch (4) to START until the indicator light comes on. Then move the switch straight to RUN without stopping in the OFF position.

6. Select high or low heat with HI-LO switch (5). The heater will always start on low heat no matter how the HI-LO switch is set, and will go to high after it starts if the switch is at HI.

NOTE

When the switch is at HI the heater will automatically transfer to low heat if the coolant temperature reaches 190 degrees F, and will switch back to high heat if the coolant temperature drops to 120 degrees F. If the coolant should reach a temperature of 245 ± 15 degrees F, the heater stops automatically and must be restarted manually.

7. If the heater doesn't start, try again. If it doesn't start in three tries, troubleshoot it (page 3-15).

CAUTION

To avoid discharging the batteries, do not operate the lights, radios, or other electrical equipment for very long while the coolant heater is running. Always turn off the heater and close the coolant shut-off valves when starting the engine.

8. After running the engine coolant heater for 12 hours, run the engine until batteries are charged. Stop the coolant heater while the engine is running. Keep the fuel tank full.

9. To turn the heater OFF, move the RUN/OFF/START switch to OFF. The heater will stop burning right away, but the combustion air blower will run until the heater is purged of fuel and the burner is cool. The indicator light will stay on until the blower stops. Close the coolant shut-off valves by turning clockwise whenever the heater is stopped.

10. When indicator light goes off (blower has stopped) turn MASTER SWITCH OFF.

OPERATION UNDER UNUSUAL CLIMATIC CONDITIONS

OPERATION OF TURRET IN COLD WEATHER

During "before-operation checks and services," check all exposed optical surfaces, including the image transfer assembly, daysight, and nightsight, for proper operation. Snow or ice may have formed on lenses or mechanical parts (perhaps unnoticeably). Avoid breathing on lenses. Also, the eyepieces of the nightsight, daysight, or image transfer assembly may fog during operation and may need cleaning. The TOW weapon system is not designed to operate at temperatures below −31.5 degrees C (−25 degrees F). Nightsight battery current is weaker at low temperatures.

OPERATION OF TURRET IN HOT WEATHER

The most sensitive parts are the optics and the missile. Don't expose sight components and the encased missile to direct sunlight for long periods. If no suitable shelter is available, use a tarpaulin to either cover the vehicle or to rig a temporary shelter. Leafy branches may also be used to protect the turret. The TOW weapon system is not designed to operate at temperatures above +60 degrees C (+140 degrees F).

OPERATION OF TURRET IN HIGH HUMIDITY

CAUTION

Do not use the M1 antifogging kit on the front lens of the nightsight; it fouls up the infrared image. See lens cleaning instructions in chapter 3.

The turret is designed to operate properly in all normal conditions of humidity. During conditions of extremely high humidity use the antifogging kit (6850-00-127-7193). If applied frequently, it will prevent moisture from collecting on lenses. Even though the turret and optics are designed for high humidity, the equipment should still be protected during wet weather. When the launcher components and encased missiles have been exposed to wet weather, carefully remove all moisture from optical surfaces and those that are covered by protective covers, cups, etc. The encased missile and all weapons system components should be dried if tactical situation permits. Don't get water in the electrical connectors.

TA 070953

OPERATION UNDER UNUSUAL CLIMATIC CONDITIONS

OPERATION OF TURRET IN SALT WATER AREAS

CAUTION

Operation in salt water areas can cause corrosion of the turret unless the following precautions are observed.

1. After exposure to salt water or salt water spray, clean all optics and exposed parts of turret with fresh water.
2. Dry lens of nightsight by dabbing lightly (do not rub) with a clean cotton pad.
3. Dry all other parts with a clean cloth. Do not disassemble.
4. Clean all lenses according to special cleaning instructions on pages 3-40 and 3-41.

OPERATION OF THE M60 MACHINEGUN IN EXTREME WEATHER CONDITIONS

Operate and maintain the M60 machinegun under extreme weather conditions as described in TM 9-207.

EMERGENCY OPERATION OF VEHICLE

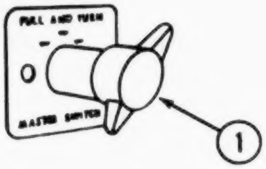
STARTING THE ENGINE WITH OUTSIDE POWER

The M901 vehicle can be started when the batteries are dead using a slave cable and an outside electrical source. The source is usually another vehicle, but a charged set of batteries will also do. These instructions are for slave starting the vehicle with another vehicle. The M901 vehicle can also be used as the power source to start another vehicle.

WARNING

Do not allow personnel between vehicles during slave starting.

1. Position the source vehicle next to the vehicle so that the slave cable can reach the auxiliary power receptacles on both vehicles.
2. Make sure the MASTER SWITCH (1) on both vehicles is OFF.



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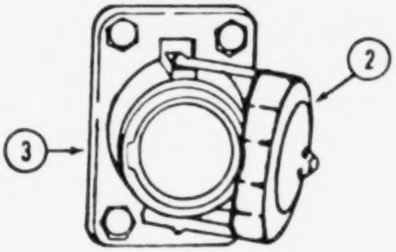
EMERGENCY OPERATION OF VEHICLE

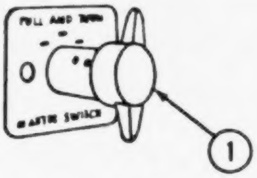


3. Unscrew the cap (2) from the auxiliary power receptacle (3) on each vehicle.

4. Connect the slave cable to the receptacle (3) on the vehicle to be started first, then to the auxiliary power receptacle on the source vehicle.

CAUTION

Make sure the cable prongs match the receptacle holes, + to + and – to –.



5. Turn the MASTER SWITCH (1) ON on the dead vehicle and go ahead with a normal start (pages 2-103 through 2-105). Make sure the engine of the source vehicle is running fast enough to show charging on that vehicle's battery-generator gage.

6. After the engine starts, disconnect the slave cable from both vehicles, and screw the caps (2) back onto the receptacles (3).

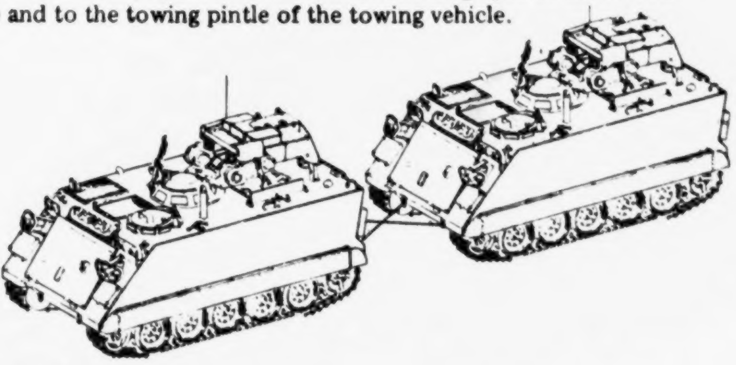
TOW-STARTING VEHICLE

WARNING

Before hooking up a tow bar or tow cables, or disconnecting the drive shafts between the differential and final drives, chock the vehicle with blocks so that it cannot move.

The M901/M901A1 vehicle can also be started by being towed, using a tow cable or tow bar. A tow bar is preferred but tow cables will do. The towing vehicle must be of the same size and weight as the towed vehicle or larger.

1. If a tow bar is used, connect it to the front towing eyes of the towed vehicle and to the towing pintle of the towing vehicle.

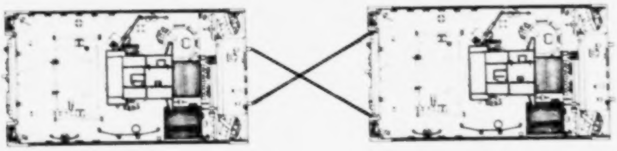


EMERGENCY OPERATION OF VEHICLE

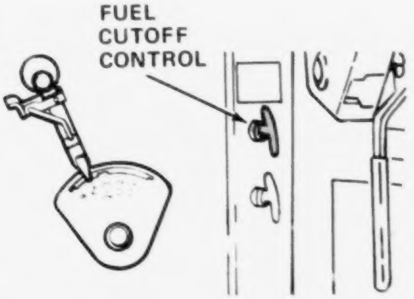
2. If cables are used, cross two cables in an X between the front towing eyes of the towed vehicle and the rear towing eyes of the towing vehicle.

WARNING

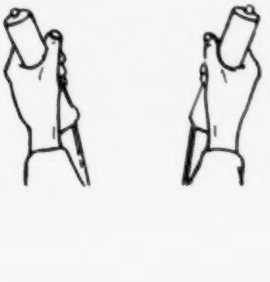
When using tow cables, close the driver's hatch on the towed vehicle to protect driver if cable breaks.



3. Make sure the MASTER SWITCH on the towed vehicle is on, the shift lever is in neutral, and fuel cutoff control is pushed in.



4. Release the brakes by pulling back on both steering levers so the lock buttons pop up. Ease the levers all the way forward.



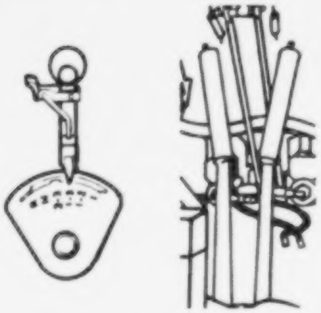
WARNING

**Never touch the lock buttons while the vehicle is moving.
If the steering lever locks while moving, damage could occur to both personnel and vehicle.**

TA 157936

EMERGENCY OPERATION OF VEHICLE

5. Move out and find a straight, flat stretch of road or ground. When speed is up to about 20 mph, put the shift lever in 1-3 position and press the accelerator down about halfway.



CAUTION

Don't leave the shift lever in any driving range for more than about 5 seconds under tow. If engine doesn't start, shift back to N range and let the transmission rest for a few seconds.

6. When the engine starts move the shift lever to N range and signal the towing driver to stop. If vehicle doesn't start in three tries, stop and troubleshoot the engine.

TOWING DISABLED VEHICLE

WARNING

Before hooking up a tow bar or tow cables, chock the vehicle with blocks so that it cannot move.

1. If vehicle is to be towed no more than 30 miles at speeds of less than 10 mph, connect a towbar or tow cables as shown on pages 2-194 and 2-195. Keep the range selector of the towed vehicle in N range while towing.
2. If the vehicle is to be towed more than 30 miles, or faster than 10 mph, open the power plant door and disconnect the universal joints as shown on the next page. Position the vehicle so its towing pintle lines up with the pintle eye on the drawbar or towbar of the load you want to tow. Take out the locking pin, pull up on the pintle latch, and open the pintle. Hook the drawbar or towbar eye on the pintle, pull on the latch, and close the pintle. Make sure the latch locks the pintle closed, then put in the locking pin to secure the latch.

EMERGENCY OPERATION OF COMBAT VEHICLE

TOWING DISABLED VEHICLE

WARNING

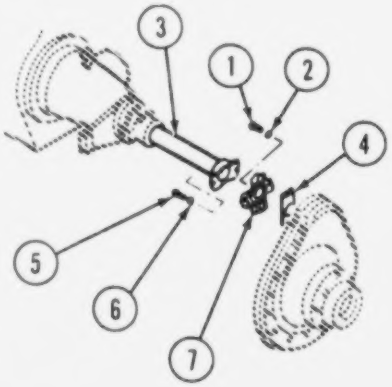
Always use a towbar when the universal joints are disconnected. The vehicle has no steering or braking control with universal joints disconnected. Towing with cables may cause damage to personnel and to both vehicles.

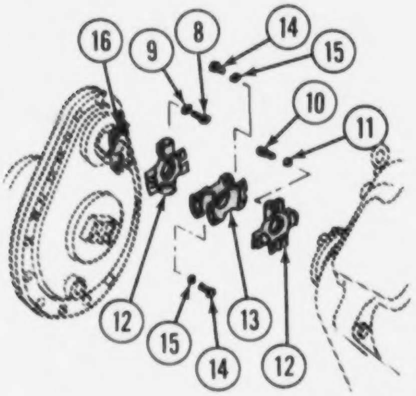
CAUTION

Failure to disconnect the universal joints to tow a vehicle more than 30 miles and/or at speeds above 10 miles per hour could result in severe damage to the transmission or differential of the towed vehicle.

Disconnect universal joints as follows:

(a) Left Universal Joint. Remove four outer screws (1) and washers (2). This should give enough slack so that the drive shaft (3) can be dropped clear of the stub shaft (4). If more slack is needed remove four inner screws (5) and washers (6). Then take out the universal joint (7) and drop the drive shaft (3). Save the parts taken out so organizational maintenance can put it back together. Leave the stub shaft (4) in place. Even if it works out under tow, it will keep dirt out of the final drive while it's there.





(b) Right Universal Joint. Remove four outer screws (8) and washers (9) and four differential screws (10) and washers (11). It should be possible to remove the universal joints (12) and connector (13) as an assembly. If necessary, take out eight connector screws (14) and washers (15). Then take out the connector (13) and universal joints (12) separately. Save all the pieces and leave the stub shaft (16) in place.

SECURING AN INOPERABLE RAMP

When a ramp cable is badly frayed or broken, close the ramp manually and latch it with the driver's ramp lock. To make sure that the ramp will stay locked, proceed as follows:

WARNING

There is no warning system for the ramp cable. Usually when the ramp cable is broken, the ramp is manually raised and locked, but will free fall open when unlatched by the driver. The ramp weighs about 400 pounds and could crush personnel or equipment when it falls open unexpectedly.

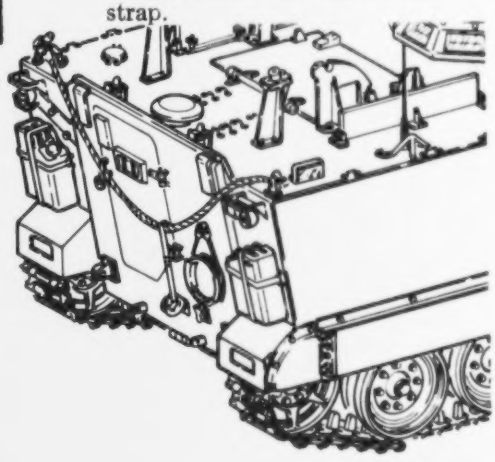
1. Tie tow cable ends to vehicle lifting eyes with two tow hooks by putting tow cable eye through lifting eye and securing with tow hook in tow cable eye.

2. Tie middle of tow cable to towing pintle with any suitable strap.

3. If possible, post a warning sign on ramp and tag driver's ramp locking handle, warning of badly frayed or broken ramp cable.

NOTE

These are only temporary safety procedures. Replace ramp cable right away. Better yet, perform prescribed maintenance services and inspections and replace the ramp cable before it becomes badly frayed or broken.

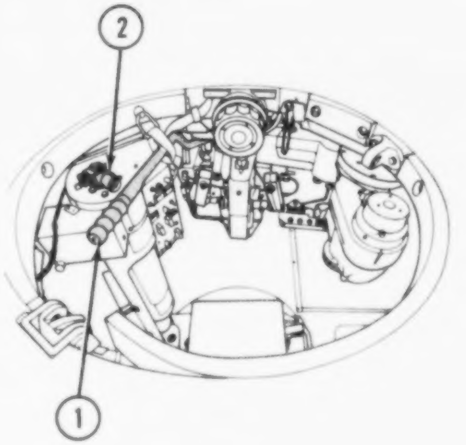


TA 070958

EMERGENCY OPERATION OF COMBAT VEHICLE

OPERATION OF TURRET AND FIRE CONTROL EQUIPMENT WITH EMERGENCY POWER

Turret can be operated and missiles fired without vehicle power by the use of the emergency power battery and the manual hydraulic backup system.

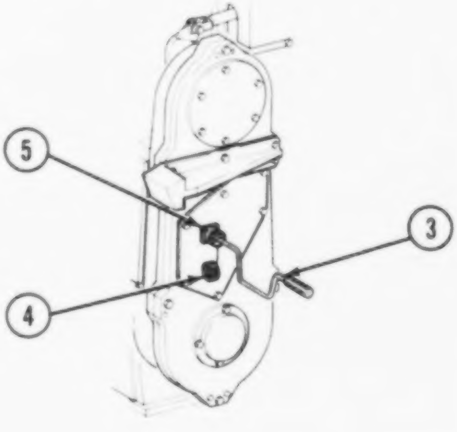


NOTE

Gunner should not operate pump since this requires a considerable amount of physical effort which would tend to have an adverse effect on his ability to accurately track a target.

Erection from Stow with Emergency Power.

1. Place EMER PWR switch to on (up position). (Turret power does not need to be off but emergency power battery must be installed and good: in-band when tested in position 1 on MGS.)
2. Place MODE SELECT switch to ERECT.
3. Operate hand pump (1) to build pressure on accumulator gage (2) to at least 1400 psi. Operate pump intermittently to keep pressure above 1400 psi until launcher is erected and locked.



NOTE

Handcrank and hand pump may be operated at the same time.

4. Take handcrank (3) from stowage. Remove cap (4) from crank receptacle (5) in left erection arm and insert crank into receptacle. (Handle must be all the way in and armor plate must be down.)
5. Turn handcrank until launcher is in erected position and locks are engaged. (LAUNCHER READY and LAUNCHER ERECT lights should be on.)
6. Take out handcrank and stow in assigned place.

TA 070959

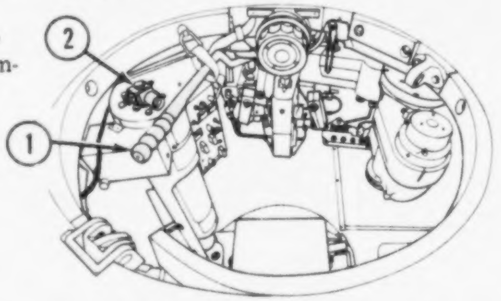
EMERGENCY OPERATION OF VEHICLE

Loading with Emergency Power.

CAUTION

Make sure machinegun is in stowed position when operating turret.

1. Place the EMER PWR switch to on (up position).
2. Operate the hand pump (1) to build up pressure on the accumulator pressure gage (2) to at least 1750 psi.
3. Use hand controls to rotate turret to zero degrees in azimuth using slew switch. (AZ LOAD light will come on at this position.)

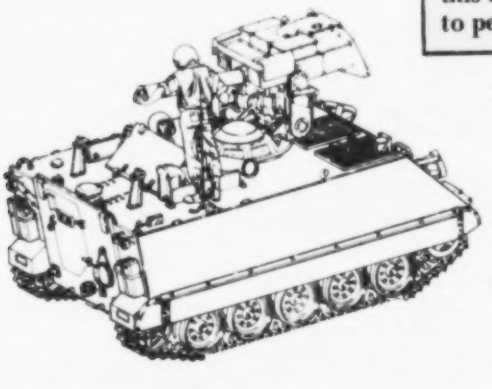


NOTE

Operate pump to keep pressure above 1750 psi until launcher is in the load position.

WARNING

Ensure that the handcrank is removed from the erection arm handcrank receptacle before placing the launcher in the load position. Failure to do this could result in serious injury to personnel.



4. Elevate launcher until ELEV LOAD light is on. (Light comes on at +35 degrees elevation.)
5. Turn MODE SELECT switch to LOAD.
6. Push up on ERECTION DRIVE switch and hold until LOAD POSITION light comes on and launcher is in load position. Release ERECTION DRIVE switch.
7. Load launcher in accordance with steps 6 thru 13, pages 2-158 and 2-159 (missile loading/reloading procedures).

NOTE

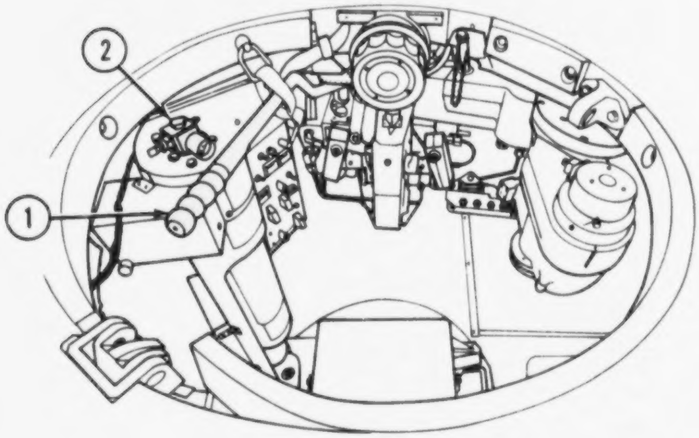
Launcher may be loaded from top deck, without placing it in the load position if tactical situation permits.

TA 158952

EMERGENCY OPERATION OF VEHICLE

Erection from Load with Emergency Power.

1. Place the EMER PWR switch to on (up position).
2. Place the MODE SELECT switch to ERECT.
3. Operate the hand pump (1) to build up pressure in the accumulator. (Pressure gage (2) should read at least 1750 psi.)

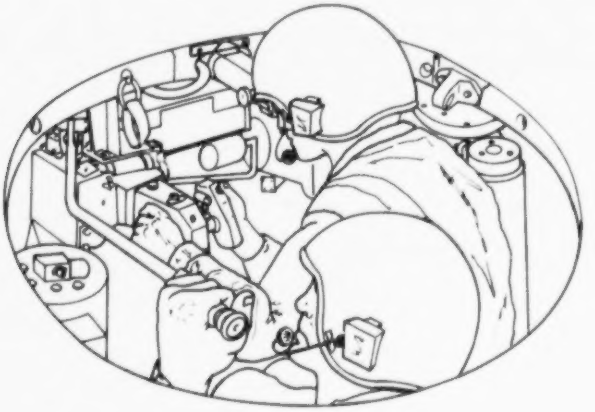


4. Erect launcher by operating the ERECTION DRIVE switch until LAUNCHER ERECT and LAUNCHER READY lights are on.

TA 070961

EMERGENCY OPERATION OF VEHICLE

Tracking and Firing with Emergency Power.



1. Make sure all hatches are closed.
2. Place EMER PWR switch to on (up position).
3. Build hydraulic pressure to 1750 psi using the hand pump.
4. Select the wide angle 3X telescope or wide field-of-view nightsight for acquisition. To conserve hydraulic pressure use only slew mode in acquiring the target.

CAUTION

If pumping is in progress while gunner is tracking, he may miss the target. Gunner should indicate when additional pumping is required.

5. When target is acquired, turn sight select switch to 13X or pull out FOV selector to select narrow field of view if using the nightsight.
6. Fire when ready; keep tracking the target until missile impacts.

Stowing with Emergency Power.

Although the vehicle can be moved with the launcher erected, it may be necessary to stow it to gain clearance for low overpasses, wires, and other obstacles, and to cross rivers and streams. It may also be necessary for faster travel. (The maximum speed of the vehicle with launcher erected is only 5 mph.) Stow the launcher as follows:

TA 070962

EMERGENCY OPERATION OF VEHICLE

1. Make sure that the machine gun and mount are in the stow position.
2. Build hydraulic pressure to at least 1750 psi on the accumulator pressure gage (2) using the hand pump (1), and operate pump intermittently to keep pressure above 1750 psi until launcher is in the stow position.
3. Turn the turret to 180 degrees in azimuth by the shortest route until AZ STOW light comes on. Use slew mode to conserve pressure.
4. Move launcher up or down to get the ELEV STOW light to illuminate.

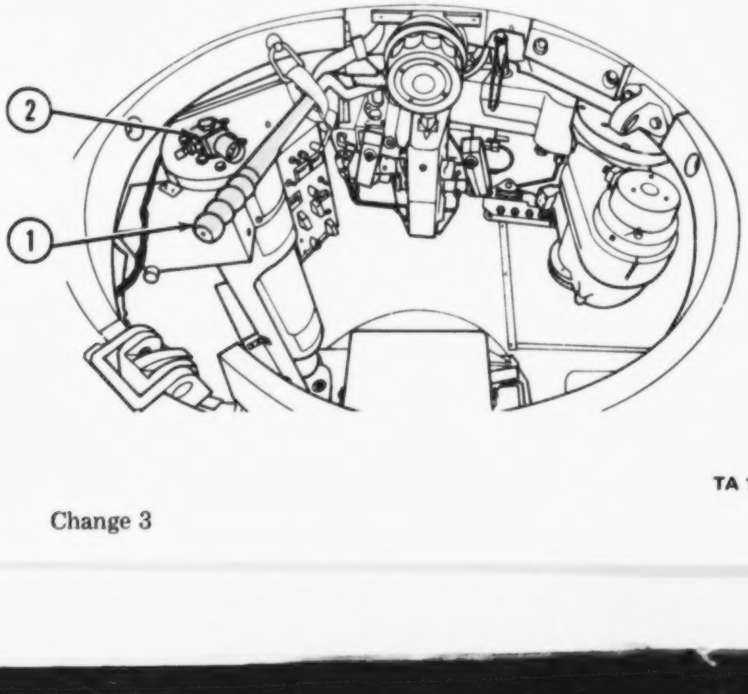
WARNING

Ensure that the handcrank is removed from the erection arm handcrank receptacle before placing the launcher in the stow position. Failure to do this could result in serious injury to personnel.

NOTE

Operate pump to keep pressure above 1750 psi until launcher is in the stow position.

5. Turn MODE SELECT switch to STOW.
6. Hold ERECTION DRIVE switch up until launcher is stowed.



TA 158953

EMERGENCY OPERATION OF VEHICLE

OPERATION OF TURRET IN OVERRIDE

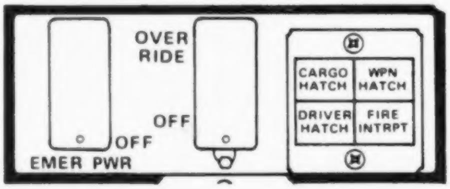
WARNING

Functions of the M901/M901A1 vehicle are inhibited when conditions exist that could endanger the crew or equipment. Unless justified by an extreme emergency, do not override these safety features without first ensuring that the hazardous conditions being protected against do not exist. For example: If a hatch light is on, do not use the OVERRIDE switch without confirming that the hatch is closed and latched. (Also see pages 2-132 and 2-133.)

Placing the OVERRIDE switch in OVERRIDE allows the override of the following normally inhibited functions:

A fire interrupt condition.

The normal condition that one missile be safe before the other can be armed.



NOTE

Azimuth and elevation movement is not inhibited when cargo hatch is opened.

The normal condition that azimuth and elevation movement are inhibited when a hatch is open.

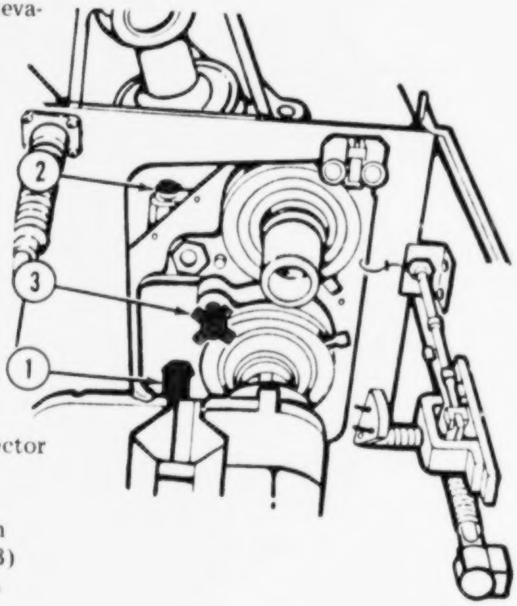
TA 159237

EMERGENCY OPERATION OF VEHICLE

EMERGENCY OPERATION OF ITA SIGHT SELECTION

If the sight select switch on the hand control assembly is inoperative, the sight select circuit may be stuck in one position, may be continuously recycling, or may not stop at a selected position. When in a combat situation, the emergency action may be accomplished from within the vehicle.

1. Fully open the cargo hatch, traverse the turret to 180 degrees, and lower the launcher in elevation.



2. Disconnect ITA cable connector (1) from ITA.
3. Depress plunger (2) and turn manual sight select switch (3) until arrow on switch points toward desired optics.
4. Release plunger, verify that proper sight is selected, and switch is locked in position.
5. If proper sight is selected, continue with mission.
6. After mission is completed, notify organizational maintenance personnel.

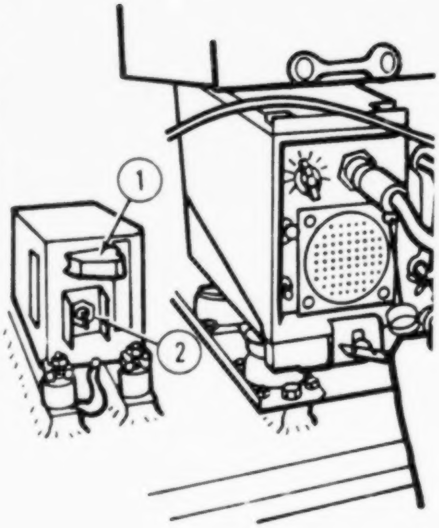
TA 158955

EMERGENCY OPERATION OF VEHICLE

EMERGENCY OPERATION OF RADIO

CAUTION

Turn BATTLE OVERRIDE switch ON only during a critical emergency and only long enough to transmit or receive an urgent message.



The electrical transient suppressor contains a BATTLE OVERRIDE switch (1) in addition to the normal ON/OFF circuit breaker (2). When the ON/OFF circuit breaker is tripped due to an overload condition (too much voltage), the circuit may be bypassed with the BATTLE OVERRIDE switch.

WATER OPERATIONS (FORDING)

PREPARATION OF VEHICLE

1. Check hull drain plugs, pipe plugs, and bolted access covers for tightness.

WARNING

Do not swim the carrier. The carrier may sink and personnel may drown or be injured. Only fording to a depth of 40 inches is allowed.

Choppy water can cause the carrier to flood/sink and personnel to drown. If waves are more than 6 inches high, it isn't safe to ford carrier.

CAUTION

Make sure all access covers and drain plugs are tight and flush with hull bottom. If not, vehicle will leak.

WATER OPERATIONS (FORDING)

2. Check bilge pump operation with vehicle on level ground. Any water in the bilge should discharge through the outlets. Test by covering each outlet with your hand. If pump is working, an air stream can be felt. Inspect screens around bilge pump for debris. Make sure hole in bilge pump housing is open.

3. Make sure track shrouds are properly installed and in good condition.

4. Make sure power plant door is secure.

5. Check ramp-to-hull seal. Raise and lock ramp. Make sure ramp door is closed and latched and seals are intact.

6. Extend and lock trim vane.

WARNING

Make sure that basic issue items are in their assigned position and are properly tied down before entering the water. If load is not distributed properly, or shifts, vehicle could tip over and sink. Check trim and freeboard after entering water. Shift cargo and personnel, if necessary, to obtain good trim and at least 5 inches of freeboard at right front corner of vehicle.

Maximum capacity is 5 men including components of end item and expendable supplies. Do not attempt to load additional cargo.

7. Make sure all periscopes are installed.

8. Turn on vehicle interior lights.

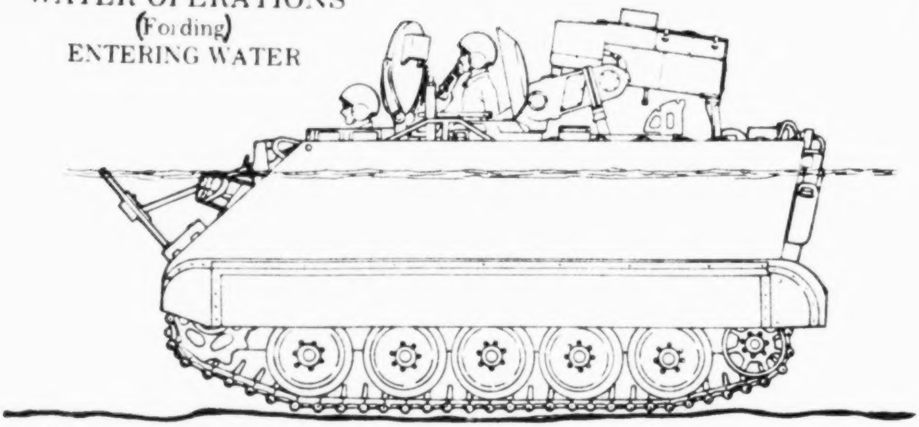
9. Close and latch cargo hatch. Fully open gunner's and driver's hatch.

10. Place launcher in stow position.

WARNING

Do not erect launcher while fording the vehicle since this may cause vehicle to tip over.

WATER OPERATIONS
(Fording)
ENTERING WATER



1. Turn on both bilge pumps.
2. Select firm ground, as free of rocks, stumps, or debris as possible, to enter water. Avoid soft ground or steep grades where vehicles can lose traction and bog down or skid. Check entry point for underwater obstacles.

WARNING

- Do not enter water with high, choppy waves that overwash front of vehicle and flood power plant compartment.
- Do not attempt fording if current exceeds allowable limits. Vehicle could be swamped and personnel could be injured or killed.

Observe the following depth versus current limits:

DEPTH VERSUS CURRENT

DEPTH	MAXIMUM CURRENT ALLOWED
30" - 40"	2.5 mph (Walking Speed)
20" - 30"	4 mph (Doubletime or fast walk)
10" - 20"	6 mph (Jog or slow run)
10" or less	10 mph (Fast run)

3. When entering from a firm, gradual slope into water, use range 1 and keep speed to slow walk (2½ mph) or less at 30% slope or greater; walk (5 mph) 20% slope or less.
4. **When entering water from a steep slope, or a slope with obstacles, go even slower than 10 mph. Keep a close watch to see that water does not enter intake and exhaust grilles and flood the power plant compartment. If water appears to be swamping vehicle and vehicle is committed to entering water, accelerate to raise front of vehicle to get vehicle waterborne.**

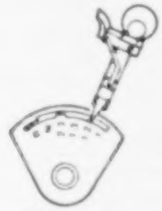
WATER OPERATIONS (FORDING)

CONTROLLING VEHICLE IN WATER

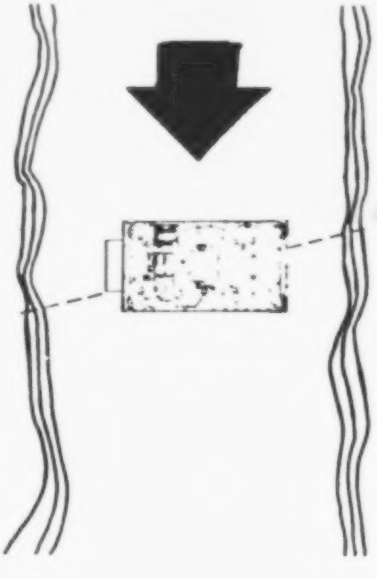
WARNING

Use extreme caution when driving in water. Do not tow one vehicle with another. Do not open cargo hatch.

1. If tactical conditions permit, keep top hatch covers (except cargo hatch) open.
2. If vehicle shows signs of flooding or swamping, accelerate and head for nearest shore.



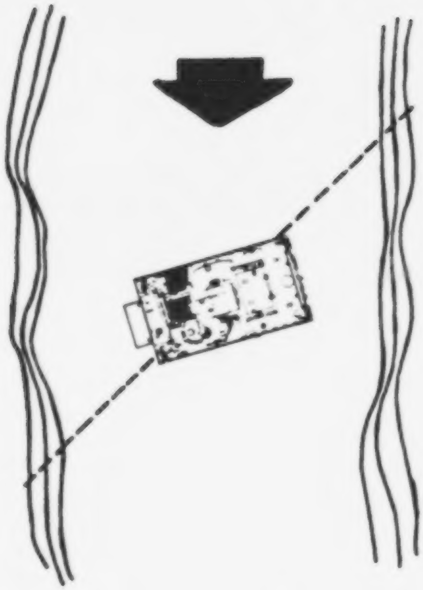
3. Keep shift lever in 1-2 range except when it is necessary to stop or back up.
4. Steer vehicle the same in water as on land, but use pivot steering levers instead of differential steering levers, and allow for much slower vehicle reaction; it's easy to overshoot turns. Release pivot steering levers before a turn is complete and allow momentum of vehicle to complete turn.
5. The fastest way to cross a slow stream (2 mph or less) is to head straight across and allow the stream to carry vehicle down stream until it reaches the far bank. If an exit must be made directly across from entry point, head upstream and cross at an angle.



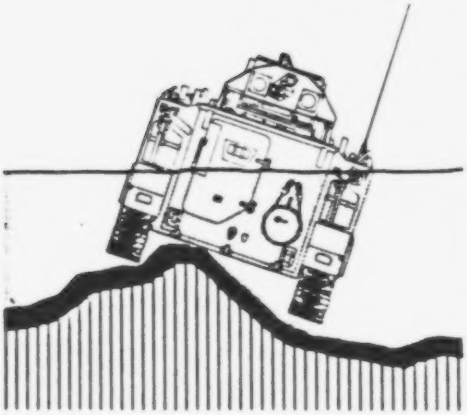
NOTE

Discard speedometer readings. Readings are incorrect and meaningless while performing water operations.

WATER OPERATIONS (FORDING)



6. Avoid crossing a swift stream directly across the current. The best way to cross a swift stream is to head the vehicle diagonally downstream.



7. If vehicle hits an underwater obstacle, the vehicle may roll and take in water through the air intake and exhaust grilles. The driver shall apply brakes and reduce speed; then shift to R, back off, and go around the obstacle. Do not try to cross over or go through obstacles; vehicle may roll or hang up.

WATER OPERATIONS (FORDING)

STOPPING IN WATER

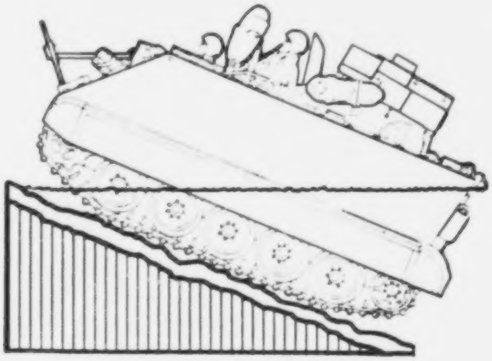
1. To stop in water, release the gas pedal, and pull back on both pivot steering levers. When tracks have stopped, release levers and shift to R, then press the gas pedal.

CAUTION

Don't stop suddenly. Vehicle will pitch down and could cause water to enter the engine compartment.

2. When vehicle has stopped, release accelerator pedal and shift to N.

LEAVING WATER



1. Avoid mushy, muddy, or steep slopes. Avoid exiting where there are large rocks or considerable amounts of debris. Approach shore as squarely as possible, and attempt to maneuver vehicle so that both tracks strike land at the same time.
2. Ease up on the gas pedal to reduce track speed before striking ground, then shift to range 1 when tracks strike ground.

NOTE

The critical time during an exit is when the tracks first strike the ground. Once either track strikes, steering becomes difficult until both tracks can get good traction for steering. Use pivot steering levers to maintain control until vehicle is clear of water.

3. Climb bank in range 1 and avoid skidding sideways or spinning tracks.

WATER OPERATIONS
(FORDING)
AFTER WATER OPERATION

1. Check trim vane hinges for obstructions and retract trim vane.
2. When bilge is clear of water, stop bilge pumps.
3. Flush all the components of the vehicle with fresh water after operating in salt water.

AFTER COMPLETE SUBMERSION

If complete submersion occurs, the turret will be removed by direct/general support, disassembled, and cleaned. Grease and oil in accordance with LO 9-2350-259-12. After exposure of machinegun to water (accidentally splashed or submerged) for a long time, water seepage into lubricated parts will occur. Drain, wipe clean, and oil the gun, especially if salt water exposure has occurred, in order to avoid corrosion. Notify organizational maintenance personnel so complete disassembly, cleaning, and lubrication of the weapon can be done as soon as the situation permits.

MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

NOTE

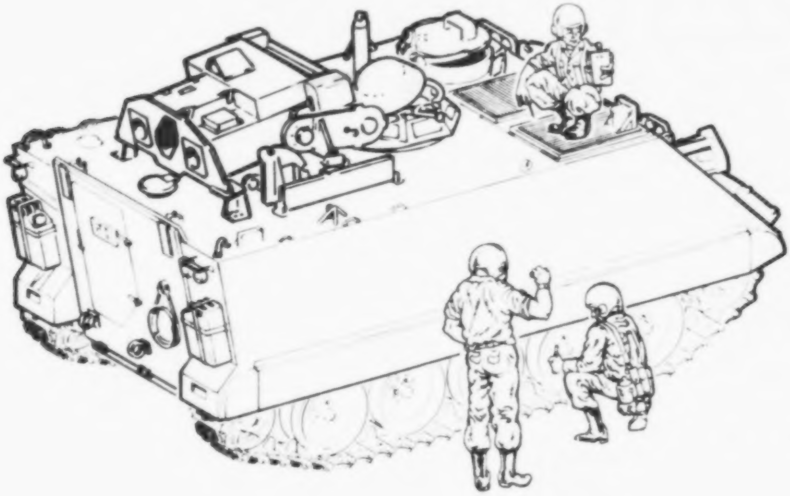
For the proper lubricant and service intervals, see LO 9-2350-259-12.

SERVICE INTERVALS – UNUSUAL CONDITIONS

For safer, more trouble-free operation, ensure that vehicle is serviced at required intervals.

SERVICE INTERVALS – NORMAL CONDITIONS

The M901/M901A1 vehicle will often require extra service and care when operated under unusual conditions. High or low temperatures, long periods of hard use, continued use in sand, water, mud, or snow will break down the lubricant. This means adding or changing lubricant more often.



TA 159238

Section II. TROUBLESHOOTING

TROUBLESHOOTING TABLE

Table 3-1 lists the common malfunctions which may be found during the operation or maintenance of the M901/M901A1 vehicle or its components. Test/inspection and corrective actions should be performed in the order listed.

This manual cannot list all possible malfunctions, nor all tests, inspections, and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify organizational maintenance.

The way the vehicle is operated and maintained will determine how often the troubleshooting table has to be used. The table starts on the next page. Use the component guide for quick reference.

Component ... Page
Engine ... 3-3
Transmission ... 3-8
Transfer Gearcase ... 3-10
Control Differential and Final Drives ... 3-10
Tracks and Suspension ... 3-11
Battery and Electrical System ... 3-13
Hull ... 3-14
Ramp Hydraulics ... 3-14
Bilge Pumps ... 3-14
Heaters ... 3-15
Smoke Grenade Launcher ... 3-16
IR Periscope ... 3-16
Machinegun ... 3-17
Turret and Fire Control Equipment ... 3-20

TA 159239

Table 3-1. Troubleshooting - Continued

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

ENGINE

1. ENGINE FAILS TO CRANK

Step 1. Check to see if MASTER SWITCH is OFF.

Turn MASTER SWITCH ON.

Step 2. See if shift lever is in N (neutral) position.

Place shift lever in neutral.

Step 3. If weather is cold, check that correct oil is in crankcase (see LO 9-2350-259-12).

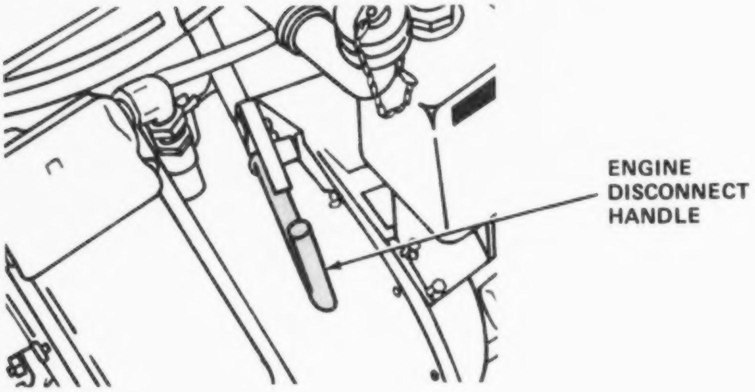
Replace with proper type of oil.

Step 4. Check battery-generator indicator with MASTER SWITCH ON.

Troubleshoot vehicle electrical system if battery indicates low charge.

Step 5. Disconnect engine from power train at engine disconnect handle.

Troubleshoot power train if engine cranks but still fails to crank after engine has been reconnected to power train.



TA 070973

Table 3-1. Troubleshooting - Continued

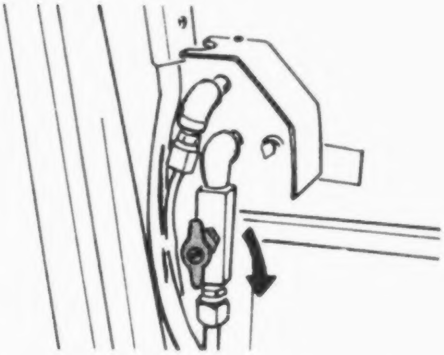
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE - Continued

2. ENGINE CRANKS BUT FAILS TO START

Step 1. Check to see if engine fuel flow valve is on.

Turn it on. (One quarter turn of the valve either way will turn fuel on or off. Fuel flow valve is shown in on position.)



Step 2. Check fuel indicator on instrument panel.

Refuel vehicle as necessary.

Step 3. Check position of fuel cutoff control in driver's compartment.

Push it all the way in.

Step 4. Check air cleaner restriction indicator.

Service air cleaner as described on page 3-51.

Step 5. Check if air box accumulator pressure is low (if used in cold weather).

If low, pump the handle to bring to required pressure. (See page 2-106.) Use air box heater system if temperature is below 40°F.

Step 6. Check air box fuel system for evidence of leaks.

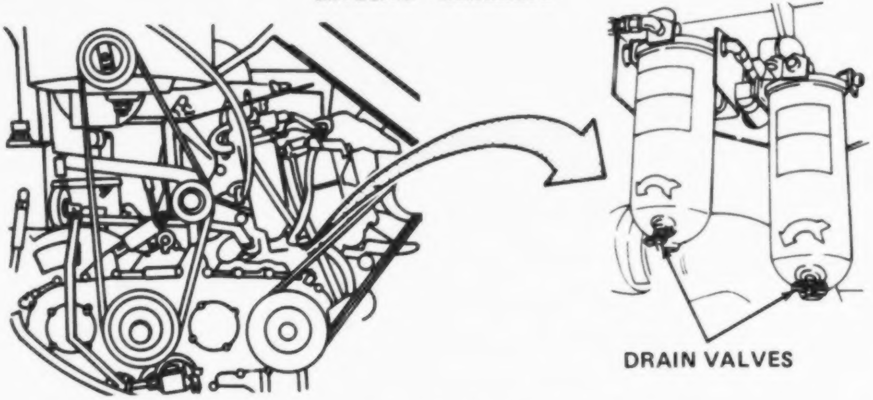
Call organizational maintenance if it leaks.

TA 070974

Table 3-1. Troubleshooting - Continued

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

ENGINE - Continued



Step 7. Check for presence of water in fuel filters.

Drain filters until clear fuel runs out. (See procedure on page 3-66.)

Call organizational maintenance if vehicle still doesn't start.

3. ENGINE OIL LOW PRESSURE WARNING LIGHT STAYS ON AFTER ENGINE IS STARTED

CAUTION

Do not operate engine with oil pressure warning light on. If oil level is low, engine damage will result.

Step 1. Check oil level with dipstick.

Add oil as necessary. (See LO 9-2350-259-12.)

Step 2. Check for wrong type of oil in crankcase. (See LO 9-2350-259-12.)

Replace with proper type.

Step 3. Check engine for evidence of oil leaks.

Call organizational maintenance if engine leaks or trouble can't be found.

TA 070975

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE - Continued

4. ENGINE OVERHEATS

Step 1. Check coolant level in radiator.

Fill with coolant if necessary.

Step 2. Check to see if external portion of radiator is clogged with debris.

Clean as necessary.

Step 3. Check condition of coolant.

Drain and flush cooling system if coolant is excessively dirty.

Call organizational maintenance if trouble persists.

5. ENGINE FAILS TO REACH NORMAL OPERATING TEMPERATURE

Step 1. Check to see if exhaust grill cover is installed.

Install cover if temperature is below -25°F.

Step 2. Check for loose connections behind driver's control panel.

Tighten connections.

Call organizational maintenance if trouble persists.

6. ENGINE DOES NOT DEVELOP FULL POWER

NOTE

At high altitude this is normal condition. Troubleshoot if condition is severe.

Step 1. Check engine oil level. It may be too high.

Drain excess oil.

Step 2. Check air cleaner restriction indicator.

Service air cleaner if clogged.

Step 3. Check fuel as instructed in step 7, malfunction 2, page 3-5.

Drain water from fuel filters as necessary.

Call organizational maintenance if trouble persists.

TA 070976

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE - Continued

7. ENGINE RUNS UNEVENLY OR STALLS FREQUENTLY

Step 1. Check to see if engine is overheating or failing to reach normal operating temperature.

Take corrective action indicated in malfunctions 4 or 5, page 3-6.

Step 2. Check for fuel leaks in engine compartment.

Call organizational maintenance if fuel leaks or trouble persists.

8. ENGINE OIL CONSUMPTION IS EXCESSIVE

Step 1. Check for high engine oil level.

Drain excess oil.

Step 2. Check engine for external oil leaks.

Call organizational maintenance if engine leaks 3 or more drops per minute or trouble can't be found.

9. FUEL CONSUMPTION IS EXCESSIVE

Step 1. Check fuel system for evidence of leaks.

Call organizational maintenance if a leak is found.

Step 2. Watch out for bad driving habits, such as unnecessary acceleration and driving in wrong gears.

Develop good driving habits.

Call organizational maintenance if trouble persists over a long period of time.

TA 070977

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE – Continued

10. EXHAUST FUMES IN VEHICLE

WARNING

Exhaust fumes are dangerous. Call organizational maintenance personnel immediately if fumes are indicated.

Step 1. Make sure engine access panels are securely in place and seals in good condition.

Remove and install properly. Call organizational maintenance if seals are bad.

Step 2. Check engine exhaust system for leaks.

Call organizational maintenance if leak is detected or if trouble can't be found.

TRANSMISSION

1. TRANSMISSION OIL HIGH TEMPERATURE WARNING LIGHT COMES ON

CAUTION

Do not operate vehicle with transmission oil high temperature warning light on. If oil level is low or transmission overheats, transmission will be damaged.

Step 1. Check for correct transmission oil level.

Add oil as necessary. (See LO 9-2350-259-12.)

Step 2. Watch out for improper driving practices. Do not drive with the range selector in the 1 range any longer than necessary.

Call organizational maintenance if trouble persists.

TA 070978

Table 3-1 Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRANSMISSION - Continued

2. ENGINE OPERATES PROPERLY BUT VEHICLE FAILS TO MOVE WITH TRANSMISSION RANGE SELECTOR AND SHIFT CONTROL IN ANY POSITION

Step 1. Check to see if engine is disengaged from power train.

Engage engine (see page 3-3).

Step 2. Check transmission oil level. Refer to LO 9-2350-259-12 for proper oil level.

Add oil as necessary.

Step 3. Check transmission for proper type oil. Refer to LO 9-2350-259-12 for proper oil.

Call organizational maintenance if wrong type is used or trouble can't be found.

3. ENGINE OPERATES PROPERLY BUT VEHICLE LOSES POWER OR FAILS TO DEVELOP FULL POWER IN ANY RANGE

NOTE

Notify organizational maintenance personnel of any unusual noises, odors, or malfunctions of the transmission.

Step 1. Check for correct transmission oil. Refer to LO 9-2350-259-12 for proper oil.

Call organizational maintenance if wrong type of oil has been used.

Step 2. Check for proper adjustment of tracks.

Adjust track tension (page 3-44).

Call organizational maintenance if trouble persists.

TA 070979

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRANSFER GEARCASE

1. NO POWER TRANSMITTED THROUGH TRANSFER GEARCASE, ALTHOUGH ENGINE IS RUNNING

See if engine disconnect is engaged.

Engage engine at engine disconnect.

Call organizational maintenance personnel if above action did not clear malfunction.

2. TRANSFER GEARCASE OVERHEATING OR EXCESSIVELY NOISY

Check for low gearcase oil level.

Add oil. (See LO 9-2350-259-12.)

Call organizational maintenance personnel if above action did not clear malfunction.

CONTROL DIFFERENTIAL AND FINAL DRIVES

1. DIFFERENTIAL OIL HIGH TEMPERATURE WARNING LIGHT COMES ON

Step 1. Check for low differential oil level and/or restricted breather.

Add oil or free breather. (See LO 9-2350-259-12.)

Step 2. See if oil line quick disconnect coupling is properly connected.

Connect properly.

Call organizational maintenance if trouble persists.

2. ENGINE AND TRANSMISSION OPERATE PROPERLY, BUT VEHICLE FAILS TO MOVE WITH SHIFT LEVER IN ANY RANGE

Check for broken or thrown track.

Repair or replace track.

Call organizational maintenance if trouble persists.

TA 070980

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

CONTROL DIFFERENTIAL AND FINAL DRIVES - Continued

3. FINAL DRIVE IS OVERHEATED

Check for low final drive oil level.

Add oil as necessary. (See LO 9-2350-259-12.)

Call organizational maintenance if trouble persists.

TRACKS AND SUSPENSION

1. VEHICLE PULLS TO ONE SIDE

NOTE

Vehicle normally pulls slightly to low side of crowned road or sloping terrain.

Step 1. Check for unequal track tension.

Adjust track tension as necessary.

Step 2. Check for buildup of mud or dirt on one or both tracks.

Clean as necessary.

Step 3. Check for worn or damaged track components. Check for worn bushings by running vehicle slowly and observing shoes as they pass over roadwheels one and two. Track shoes with worn bushings hang lower than other shoes.

Replace worn or damaged components. (See page 3-45.)

Call organizational maintenance if trouble persists.

2. VEHICLE THROWS TRACK

Step 1. Check for rocks or other foreign matter lodged in track or between sets of road wheels or idler wheels.

Clean suspension system of foreign material as necessary.

Step 2. Watch out for bad driving habits.

Avoid sharp turns at high speed or in soft terrain.

TA 070981

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRACKS AND SUSPENSION - Continued

Step 3. Check for loose or worn track.

Replace worn or damaged track shoes, check and adjust track tension.

Call organizational maintenance if trouble persists.

3. THUMPING NOISE HEARD DURING VEHICLE OPERATION

Step 1. Check for worn bushing in one or more track shoes.

Replace worn or damaged track shoes as necessary.

Step 2. Check for improperly assembled track shoes. Shoes that are not properly assembled will not lie flat.

Assemble properly. (See page 3-45.)

Step 3. Check road wheel tires for chunking.

Call organizational maintenance if chunking is excessive or trouble persists

4. EXCESSIVE NOISE IN TRACKS OR SUSPENSION SYSTEM DURING VEHICLE OPERATION

Step 1. Check for worn or seized road wheel hub bearings. This is indicated by excessive heat after a period of operation. Feel the hub with hand.

If hub is hot, call organizational maintenance personnel.

Step 2. Check sprockets and sprocket cushions for wear.

If worn, call organizational maintenance personnel.

Step 3. Check for worn track bushings.

Replace if necessary.

Call organizational maintenance if trouble can't be found.

TA 070982

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

VEHICLE BATTERY AND ELECTRICAL SYSTEM

1. HEADLIGHTS FAIL TO COME ON, OR FAIL TO DEVELOP SUFFICIENT BRIGHTNESS

Check for loose connections on driver's control panel.

Tighten connections. Go to malfunction 2 of vehicle battery and electrical system if trouble persists.

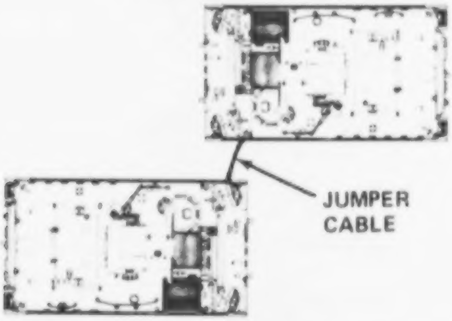
2. VEHICLE BATTERY PUTS OUT INSUFFICIENT POWER TO CRANK ENGINE AND/OR TO OPERATE LIGHT

Step 1. Check for loose battery cables.

Notify organizational maintenance, and if authorized, tighten cables.

Step 2. Check level of electrolyte in batteries.

Notify organizational maintenance, and if authorized, add distilled water to proper level. Jump start vehicle under direction of organizational maintenance if trouble persists.



Step 3. Continue to monitor BATTERY GENERATOR indicator after vehicle is started to see if generator is charging the battery.

Call organizational maintenance if battery is not charging.

TA 070983

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HULL

HULL LEAKS WATER DURING WATER OPERATION, HULL DRAIN PLUGS AND ACCESS PLATES INSTALLED

Step 1. Check ramp and ramp door seals.

Call organizational maintenance if missing or damaged.

Step 2. Check hull access and drain plugs for proper seal.

Get new plugs and covers and install them, or call organizational maintenance.

RAMP HYDRAULIC SYSTEM

UNABLE TO RAISE RAMP

Step 1. Check for low ramp hydraulic oil level and proper type oil.

Add oil as necessary. (See LO 9-2350-259-12.)

Step 2. Check for broken ramp cable or damaged ramp cylinder.

Call organizational maintenance if cable is broken or badly worn, if ramp cylinder is damaged or leaks, or if trouble can't be found.

BILGE PUMPS

BILGE PUMP RUNS BUT FAILS TO PUMP WATER

Step 1. See if pump is air locked.

Turn pump on and off several times to clear.

Step 2. Check for restricted pump inlet screen.

Clean if necessary.

Step 3. Check for restricted discharge line.

If restricted, clean bilge pump and inlet tubes.

Call organizational maintenance if trouble persists.

TA 070984

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HEATERS

PERSONNEL AND/OR COOLANT HEATERS DON'T WORK

Step 1. Check and see if fuel supply valves are off.

Turn fuel supply valves on.

Step 2. Check cable connections on heaters and on control unit for tightness.

Tighten cables if loose.

Call organizational maintenance if trouble persists.

TA 070985

Table 3-1. Troubleshooting - Continued

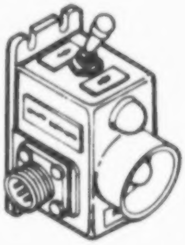
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

SMOKE GRENADE LANUCHER

1. POWER-ON LIGHT FAILS TO COME ON

Step 1. Ensure that vehicle MASTER SWITCH is positioned to ON.

Position MASTER SWITCH to ON.



Step 2. Check cable.

Ensure connections are tight.

Step 3. Check for defective light bulb.

Replace light bulb.

Call organizational maintenance if trouble persists.

2. SMOKE GRENADES FAIL TO LAUNCH

Check to make sure that smoke grenade tubes are loaded.

Load as required.

Perform misfire procedures on page 2-173.

Call organizational maintenance if trouble persists.

IR PERISCOPE

NO SIGHT PICTURE

Step 1. Check to see if cable is connected.

Connect cable. (See precautions on page 2-119.)

Step 2. Check to see if IR power is on.

Turn IR power on.

Turn I.R.-B.O. SELECT switch to B.O.

Direct exchange IR periscope.

Call organizational maintenance if trouble persists.

TA 157940

Table 3-1. Troubleshooting - Continued

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

M60 MACHINEGUN

1. FAILS TO FEED

Step 1. Check for improperly installed ammunition belt.

Reverse belt with open side of link down.

Step 2. Check for defective link of ammunition.

Insert new ammunition or link.

Step 3. Check for proper lubrication.

Oil gun as necessary.

Step 4. Check for dirty ammunition.

Disassemble and clean.

Step 5. Check for obstruction in receiver.

Remove item blocking movements. Lubricate as necessary.

Call organizational maintenance if above actions do not correct the problem.

2. FAILS TO CHAMBER

Step 1. Check for ruptured cartridge case.

Remove as required.

Step 2. Check for carbon buildup in gas cylinder.

Remove carbon as required.

Step 3. Check for damaged round.

Remove as required.

Step 4. Check for carbon buildup in receiver.

Clean as required.

TA 070987

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

M60 MACHINEGUN - Continued

Step 5. Check for dirty chamber.

Clean as required or change barrel.

Call organizational maintenance if trouble persists.

3. FAILS TO FIRE

Check for faulty ammunition.

Load good ammunition.

Call organizational maintenance if trouble persists.

4. FAILS TO EXTRACT

Check to see if gas piston is installed backwards.

Install properly.

Call organizational maintenance if trouble persists.

5. FAILS TO EJECT

Check for frozen or damaged ejector or ejector spring.

Clean gun.

Call organizational maintenance if trouble persists.

6. FAILS TO STOP

Step 1. Stop the machinegun by one of the following methods:

a. Raising the cover.

b. Twisting or breaking the belt.

c. Holding the cocking handle to the rear.

d. Simply letting it run out of ammunition and keeping the gun trained on the target.

TA 070988

Table 3-1 Troubleshooting - Continued

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

M60 MACHINEGUN - Continued

Step 2. Check gas system to make sure gas port plug (1), gas cylinder extension (3) and gas cylinder (2) are on tight.

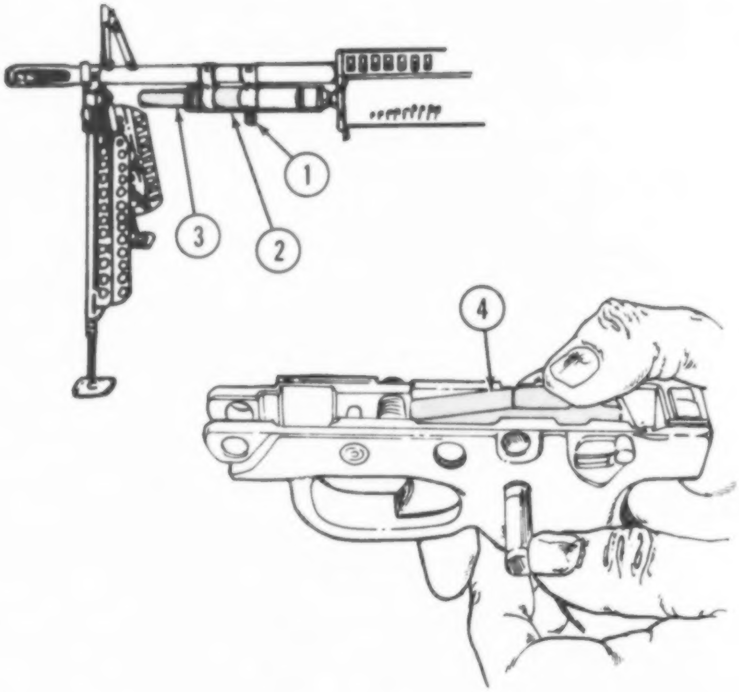
Step 3. Disassemble gun and clean the operating rod tube.

Step 4. Check for worn or broken sear (4).

Call organizational maintenance personnel if sear is worn or broken; sear notch is badly worn; or gun still fails.

NOTE

For other malfunctions of the M60 machinegun, refer to TM 9-1005-224-24.



TA 070989

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT

1. NO TURRET POWER, OR TURRET POWER LIGHT FAILS TO COME ON

Step 1. Check to see if vehicle MASTER SWITCH is on.

Turn MASTER SWITCH on.

Step 2. Check to make sure circuit breaker is not tripped.

Reset circuit breaker if tripped.

Step 3. Press TURRET POWER on lamp to check bulb.

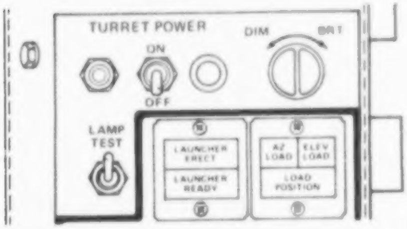
Replace bulb if bad (page 3-63).

Step 4. Check for loose cable connections going to gunner's control panel.

Tighten cables. Use appropriate emergency procedures beginning on page 2-198 if trouble persists and turret does not operate.

Call organizational maintenance as soon as tactical situation permits.

If turret operates without the light, continue with mission and call organizational maintenance as soon as it is convenient.



2. ONE OR MORE CONTROL PANEL LIGHTS FAIL TO LIGHT WHEN LAMP TEST SWITCH IS ON

Replace bulbs. (See page 3-63.)

NOTE

TURRET POWER lamp is not checked in this test.

TA 070990

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

3. LAUNCHER FAILS TO ERECT FROM THE LOAD OR STOW POSITION

CAUTION

To avoid damaging the erection drive gear shaft and bearings due to improper alinement, do not operate the erection drive with the left erection arm cover removed.

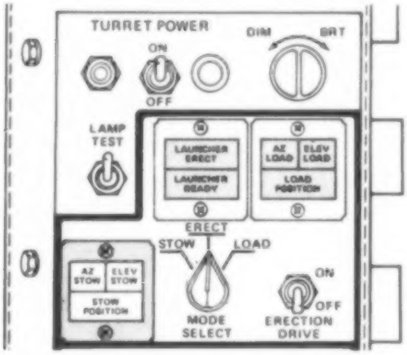
Step 1. Make sure that the TURRET POWER switch is ON (TURRET POWER lamp is lit), the MODE SELECT switch is in ERECT and circuit breaker is in (not tripped).

NOTE

AZ STOW, ELEV STOW, and STOW POSITION, or AZ LOAD, ELEV LOAD, and LOAD POSITION lights should also be on, but do not affect erection.

Turn switch to correct positions, and reset (push in) circuit breaker.

Go to malfunction No. 1, page 3-20 if TURRET POWER lamp fails to light.


TURRET POWER
ON
OFF
DIM
BRT
LAMP TEST
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
ERECT
STOW
LOAD
AZ STOW
ELEV STOW
STOW POSITION
MODE SELECT
ON
OFF
ERECTION DRIVE

Step 2. Check for loose or disconnected cables all around gunner's station.

Connect and tighten all cables.

TA 158956

Table 3-1. Troubleshooting - Continued

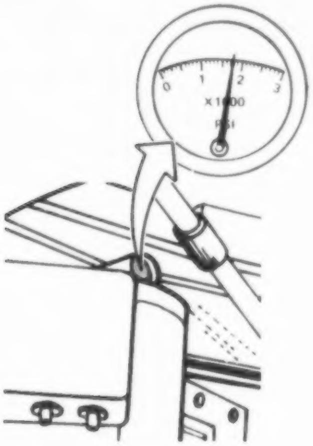
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

Step 3. Check pressure on accumulator gage. Reading should be between 1525—1900 psi.

Start engine if reading is low. If reading returns to normal with engine running, have vehicle electrical system checked.

If reading does not return to normal with engine running, use appropriate emergency procedures beginning on page 2-198 to complete mission and call organizational maintenance as soon as the tactical situation permits.



TA 157941

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

3.1 LAUNCHER DRIVES FROM LOAD POSITION TO ERECT POSITION, THEN BACK TO LOAD POSITION.

Check BATTERY GENERATOR indicator on driver's control panel for low voltage.

If low voltage is indicated, start engine and recheck BATTERY GENERATOR indicator. When indication is normal, erect launcher.

If malfunction persists with normal BATTERY GENERATOR indication, notify organizational maintenance.

TA 157942

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

4. TURRET FAILS TO TRAVERSE OR LAUNCHER FAILS TO ELEVATE

Step 1. Make sure that the vehicle MASTER SWITCH and the TURRET POWER switch are in the ON positions and the EMER PWR switch is at OFF.

Turn switches to correct positions.

Step 2. Check to see if WPN HATCH, CARGO HATCH or DRIVER'S HATCH interrupt lights are on.

Close all hatches.

Step 3. Go to malfunction No. 12, page 3-34, if lights stay on.

Step 4. Check to make sure launcher is fully erected. (TURRET POWER, LAUNCHER ERECT, and LAUNCHER READY lights should be on.)

Step 5. Go to malfunction No. 3, page 3-21 if launcher is not erected.

Step 6. Check for loose cable connections all around gunner's station.

Tighten if loose.

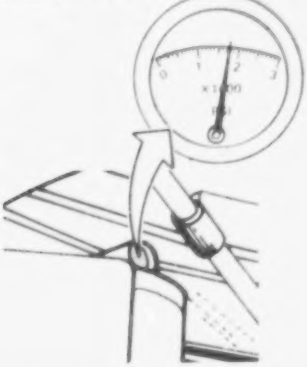
Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

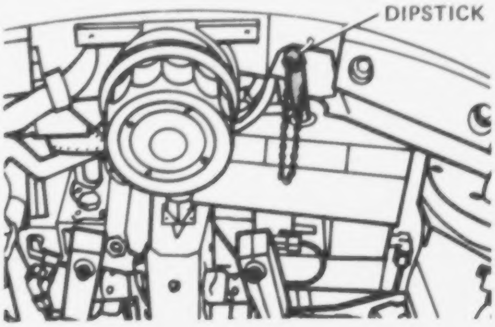
TURRET AND FIRE CONTROL EQUIPMENT - Continued

Step 7. Check pressure on accumulator gage. Reading should be between 1525—1900 psi.

Start engine if pressure is low. If reading returns to normal with engine running, have vehicle electrical system checked.



Step 8. Check hydraulic fluid at dipstick if pressure is still low. (See page 2-134 for procedure.)



Call organizational maintenance if oil is not to the line.

If oil is ok, use appropriate emergency procedures beginning on page 2-198 to complete mission and call organizational maintenance as soon as tactical situation permits.

TA 157943

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

5. UNABLE TO FOCUS AND ALINE TURRET OPTICS

Step 1. Remove nightsight and daysight/tracker from turret and reinstall in accordance with procedures on page 2-135 and 2-137.

Step 2. Grasp upper ITA and try to push it back and forth.

If it moves, call organizational maintenance.

Step 3. Perform the complete focus and alinement procedures for the daysight/tracker (page 2-150 for M901 and pages 2-156.2 through 2-156.15 for M901A1), nightsight (pages 2-153 through 2-156 for M901 and pages 2-156.2 through 2-156.15 for M901A1), and image transfer assembly (ITA) (page 2-141).

Exchange any crew replaceable parts (nightsight, daysight/tracker, nightsight battery etc.) found bad.

Call organizational maintenance if trouble cannot be corrected.

TA 159240

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

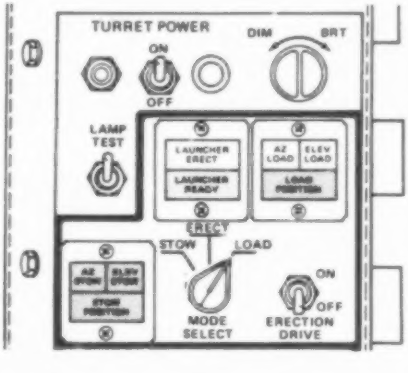
6. UNABLE TO MOVE LAUNCHER TO THE LOAD POSITION. (LAUNCHER READY LIGHT IS NOT LIT.)

CAUTION

DO NOT set the MODE SELECT switch to ERECT. If the malfunction has been caused by a broken erection arm chain (usually indicated by the ELEV LOAD light going out), setting the MODE SELECT switch to ERECT will cause the erection arm locks to extend and may result in damaged equipment due to improper alinement.

NOTE

If TURRET POWER light is off, go to malfunction 1, page 3-20.


TURRET POWER
ON
OFF
DIM
BRT
LAMP TEST
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
ERECT
STOW
LOAD
MODE SELECT
ON
OFF
ERECTION DRIVE

Step 1. If ELEVATION LOAD light goes out when load is selected, use hand controls and attempt to depress launcher while looking through WFOV objective lens.

If viewed image changes due to launcher elevation change, use hand controls and re-elevate launcher until ELEV LOAD light goes on, and reattempt load procedure.

TA 158957

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

If viewed image does not change, set TURRET POWER switch to OFF, and notify organizational maintenance you have a possible broken erection arm chain.

CAUTION

If vehicle must be moved, support and secure launcher and erection arms prior to transport. Vehicle speed should not exceed 5 mph.

Step 2. Check that LAUNCHER ERECT light is lit.
If LAUNCHER ERECT light is not lit, dismount and visually check launcher for abnormal positioning (front of launcher too far up or down, or one elevation piston out more than the other).

If launcher position is normal, elevate launcher until ELEV LOAD light is lit and reattempt load procedure.

If launcher position is abnormal, set TURRET POWER switch to OFF, and notify organizational maintenance you have a possible broken erection arm chain.

Step 3. Check for disconnected or loose cables in gunner's station.

Connect and tighten all cables.

TA 158958

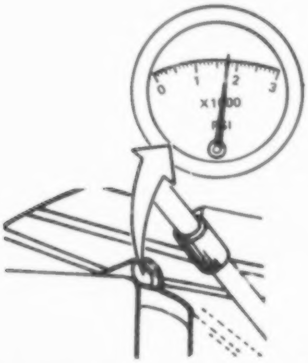
Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

Step 4. Check pressure on accumulator gage. Reading should be between 1525—1900 psi.

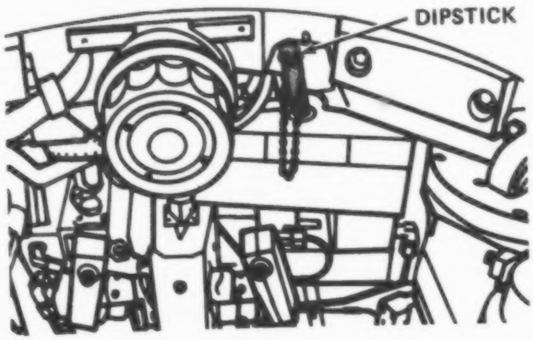
If pressure is ok, use appropriate emergency procedures beginning on page 2-198 to complete mission, and call organizational maintenance as soon as tactical situation permits.



Step 5. Check hydraulic fluid at dipstick for hydraulic fluid level. (See page 2-134 for procedure.)

Call organizational maintenance if oil is not to line.

If oil is ok, use appropriate emergency procedures beginning on page 2-198 to complete mission and call organizational maintenance as soon as tactical situation permits.



TA 158959

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

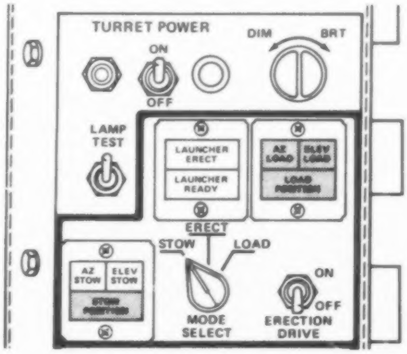
7. UNABLE TO STOW LAUNCHER. ERECTION ARM LOCKS ARE RETRACTED (LAUNCHER READY LIGHT IS NOT LIT).

CAUTION

DO NOT set the MODE SELECT switch to ERECT. If the malfunction has been caused by a broken erection arm chain (usually indicated by the ELEV STOW light going out), setting the MODE SELECT switch to ERECT will cause the erection arm locks to extend and may result in damaged equipment due to improper alinement.

NOTE

If TURRET POWER light fails to light, go to malfunction 1, page 3-20.


TURRET POWER
ON
OFF
DIM
BRT
LAMP TEST
LAUNCHER ERECT
LAUNCHER READY
AZ LOAD
ELEV LOAD
LOAD POSITION
ERECT
STOW
LOAD
AZ STOW
ELEV STOW
STOW POSITION
MODE SELECT
ON
OFF
ERECTION DRIVE

TA 158960

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

Step 1. If ELEV STOW light goes out when in stow position, use hand controls and attempt to depress launcher while looking through WFOV objective lens.

If viewed image changes due to launcher elevation change, use hand controls and re-elevate launcher until ELEV STOW light goes on, and reattempt stow procedure.

If viewed image does not change, set TURRET POWER switch to OFF, and notify organizational maintenance you have a possible broken erection arm chain.

CAUTION

If vehicle must be moved, support and secure launcher and erection arms prior to transport. Vehicle speed should not exceed 5 mph.

Step 2. Check that LAUNCHER ERECT light is lit.
If LAUNCHER ERECT is not lit, dismount and visually check launcher for abnormal positioning (front of launcher too far up or down, or one elevation piston out more than the other).

If launcher position is normal, elevate launcher to maximum elevation, then depress launcher until ELEV STOW light is lit and reattempt stow procedure.

If launcher position is abnormal, set TURRET POWER switch to OFF, and notify organizational maintenance you have a possible broken erection arm chain.

TA 158961

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

Step 3. Look for physical obstructions (tools, canvas or other loose items) on top deck.

Remove items as necessary.

Step 4. Check for disconnected or loose cables in gunner's station.

Connect and tighten all cables.

TA 158962

Table 3-1. Troubleshooting - Continued

MALFUNCTION

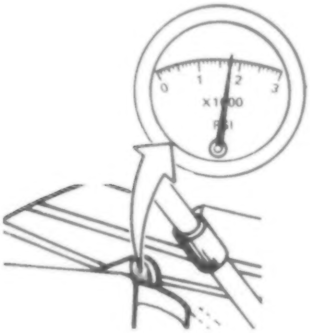
TEST OR INSPECTION

CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

Step 5. Check pressure on accumulator gage. Reading should be between 1525—1900 psi.

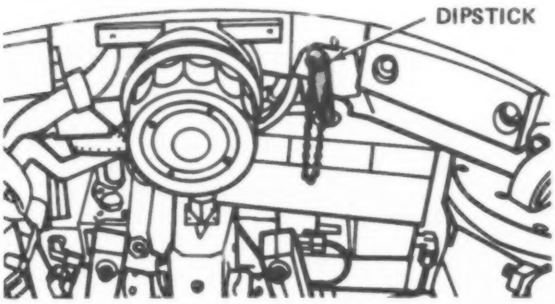
If pressure is ok, use appropriate emergency procedures beginning on page 2-198 to complete mission, and call organizational maintenance as soon as tactical situation permits.



Step 6. Check hydraulic fluid at dipstick for hydraulic fluid level. (See page 2-134 for procedure.)

Call organizational maintenance if oil is not to line.

If oil is ok, use appropriate emergency procedures beginning on page 2-198 to complete mission and call organizational maintenance as soon as tactical situation permits.



TA 158963

Table 3-1. Troubleshooting - Continued

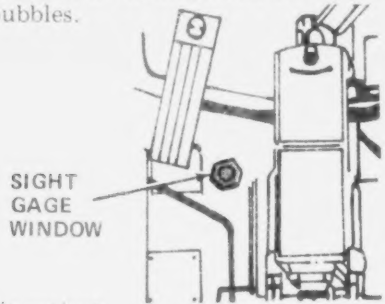
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

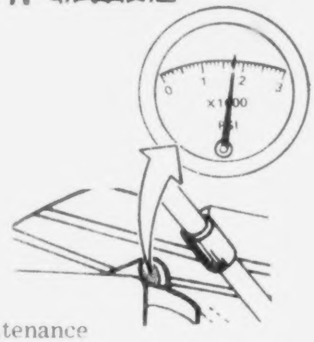
8. HYDRAULIC SYSTEM CHATTERS AND OPERATES SLUGGISHLY

Step 1. Check sight gage window for discolored fluid or bubbles.

Call organizational maintenance if fluid looks milky or has bubbles.



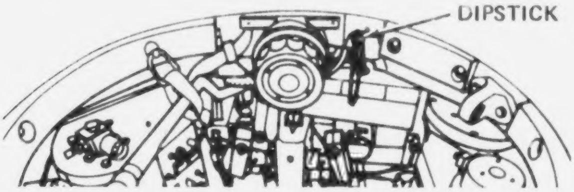
Step 2. Check hydraulic system accumulator pressure gage for proper pressure. Gage should read between 1525—1900 psi.



Step 3. Check nitrogen precharge. (See page 2-134 for procedure and page 1-20 for precharge gage readings.)

Notify organizational maintenance if nigrogen pressure is low.

Step 4. Check hydraulic fluid at dipstick.



Call organizational maintenance personnel if oil is not to line.

TA 157946

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

9. AZ AND/OR ELEV LOAD LAMPS DO NOT LIGHT

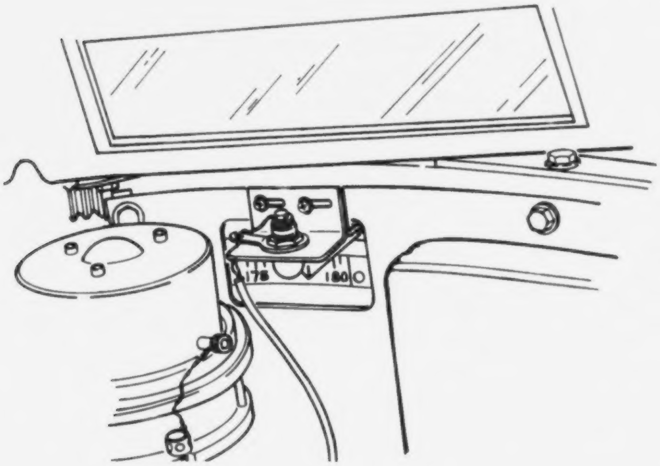
Step 1. Push down LAMP TEST switch to see if bulbs are good.

Replace bulbs if any are bad.

Step 2. Check for loose or disconnected cables in gunner's station.

Tighten cables as necessary.

Step 3. Elevate launcher to maximum elevation, and turn launcher to ZERO degrees in azimuth. Use the azimuth position indicator for reference. Then attempt to bring the launcher into the load position in the normal way.



Load from top deck if necessary and call organizational maintenance as soon as tactical situation permits.

best copy available

TA 071001

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

10. ELEV STOW AND AZ STOW LAMPS FAIL TO COME ON

Step 1. Push down LAMP TEST switch to see if bulbs are bad.

Change bulbs. (See page 3-63.)

Step 2. Check for loose or disconnected cables in gunner's station.

Tighten as necessary.

Call organizational maintenance as soon as tactical situation permits.

CAUTION

Do not drive vehicle over 5 mph if launcher cannot be stowed.

TA 071002

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

11. FIRE INTERRUPT LIGHT COMES ON IN NORMAL FIRING ZONES, OR FIRE INTERRUPT LIGHT FAILS TO COME ON IN FIRING ANGLE DANGER ZONES.

Check cable connections in gunner's station.

Connect and tighten all loose or disconnected cables.

WARNING

Use extreme care when using the OVERRIDE function. DON'T FIRE a missile INTO THE VEHICLE.

Use OVERRIDE switch as appropriate to complete mission.

Call organizational maintenance as soon as tactical situation permits.

TA 071003

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

12. INTERRUPT (HATCH OPEN) LIGHT FAILS TO GO OUT AFTER HATCHES ARE CLOSED

Step 1. Check for disconnected or loose cables going to the hatch proximity switches.

Connect and tighten all cables.

Step 2. Check for disconnected or loose cables in gunner's station.

Connect and tighten any loose or disconnected cables.

WARNING

Use extreme caution when using the override function. It also overrides the firing angle safety feature and could cause a round to be fired into the vehicle.

Use OVERRIDE switch to override malfunction if necessary and call organizational maintenance as soon as tactical situation permits.

TA 071004

Table 3-1 Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

13. UNABLE TO SELECT, ARM, OR FIRE MISSILES

WARNING

Perform misfire procedures in case of failure to fire live missiles before going to this procedure.

Step 1. Make sure launcher is erected, TURRET POWER switch is ON, and launcher is not in a fire interrupt zone.

Step 2. Make sure remote arming device circuit breaker is not tripped (out).

Push in circuit breaker.

Step 3. Check for disconnected or loose cables in gunner's station.

Connect and tighten all cables.

Step 4. Go to malfunction 11, page 3-33, or 12, page 3-34, as appropriate, if hatch or fire interrupt lights are on.

Call organizational maintenance if trouble persists.

TA 071005

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

14. UNABLE TO RETURN MISSILE TO SAFE STATUS (ARMED LIGHT FAILS TO GO OFF)

WARNING

If trigger was pressed and missile failed to fire, perform misfire procedures first. If not, go to step 1.

Step 1. Check for disconnected and loose cables in gunner's station.

Connect and tighten all cables.

Step 2. Check LEFT REMOTE ARM and RIGHT REMOTE ARM circuit breakers on gunner's control panel for tripped condition.

Reset (push in) circuit breakers.

Call organizational maintenance if trouble persists.

TA 071006

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

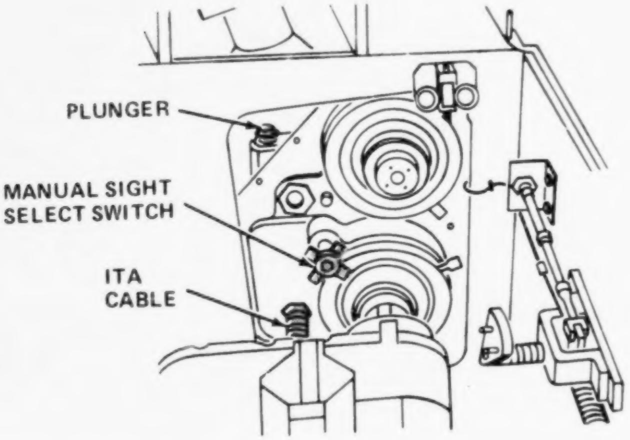
15. SIGHT SELECT SWITCH IS INOPERATIVE

Check for loose cable connections to ITA and hand controls.

Tighten cable. If fault persists, disconnect ITA cable from ITA.

Switch to desired optics (3X, 13X or nightsight) manually by pushing in plunger and turning manual sight select switch left or right as required to complete mission.

Call organizational maintenance as soon as tactical conditions permit.



16. INTERNAL MALFUNCTIONS IN THE FIRE CONTROL SYSTEM, USING DAYSIGHT ONLY

Step 1. Check for loose cables in gunner's station and on MGS.

Tighten as necessary.

Step 2. Perform the MGS self test.

Replace components as indicated in self test procedures.

Call organizational maintenance if trouble persists.

TA 158964

Table 3-1. Troubleshooting - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TURRET AND FIRE CONTROL EQUIPMENT - Continued

17. NIGHTSIGHT IS NOT ON

Step 1. Make sure turret power is on, circuit breaker on gunner's control panel is not tripped (out), nightsight actuator is on, and sight select switch on hand controls is turned to NIGHT.

Set switches properly and/or push in circuit breaker.

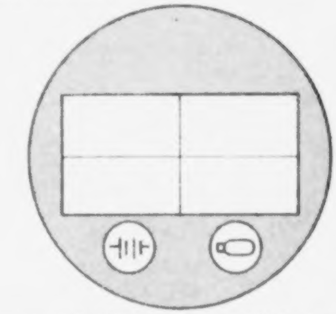
Step 2. Check to make sure that circuit breaker on vehicle power conditioner is ON and cable going to nightsight is properly connected.

18. COOLANT CARTRIDGE MONITOR LIGHTS (M901)

Replace cartridge.

NOTE

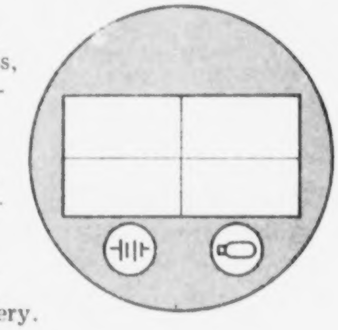
Cartridge monitor lights when gas supply is down to less than 10 minutes of nightsight operation.



19. BATTERY MONITOR LIGHTS

Check to make sure that circuit breaker on vehicle power conditioner is ON.

If not ON, set to ON. If malfunction persists, replace nightsight battery if operating on battery power. If nightsight is powered by vehicle power conditioner, for M901, turn vehicle power conditioner OFF and install nightsight battery. For M901A1, notify organizational maintenance.



NOTE

Battery monitor illuminates when battery is down to less than 10 minutes of nightsight operation.

TA 159241

Section III. MAINTENANCE PROCEDURES

GENERAL CLEANING INSTRUCTIONS

WASHING THE VEHICLE

Wash the vehicle with cold or hot running water and a mild soap.

CAUTION

Use water in engine and crew compartment sparingly, except after swimming. Install personnel heater exhaust plug and tape engine exhaust pipe shut. DON'T FORGET TO REMOVE THEM WHEN FINISHED. Don't direct stream from water hose directly at the weapon station or cabling, and don't use a steam cleaner on any weapon system component.

CLEANING INDIVIDUAL COMPONENTS

Clean components of the vehicle as follows:

WARNING

Use dry cleaning solvent only in a well-ventilated area and avoid prolonged inhalation of fumes. Wear gloves and avoid contact with skin. DO NOT USE GASOLINE, DIESEL FUEL, PAINT THINNER, OR OTHER FLAMMABLES.

1. *Metal parts except optical and electrical parts and parts exposed to powder fouling during firing.* Use cleaning solvent, item 8, appendix D. Wipe dry with a soft cloth.

2. *Metal parts exposed to powder fouling during firing.* Use rifle bore cleaning compound, item 5, appendix D. Parts requiring lubrication must be wiped dry and oiled in accordance with LO 9-2350-259-12.

TA 159242

GENERAL CLEANING INSTRUCTIONS

3. *Metal Parts on Optical Instruments.*

   a. Remove dust and other loose dirt from exterior surfaces by wiping with a clean, lint-free cloth or rinsing with clean water using a low-pressure hose.

   b. Remove grease, fungus, and ground-in dirt using a clean lint-free cloth dampened with denatured alcohol (Federal Specification O-E-760). If dirt is hard to remove, dampen lint-free cloth with water and mild soap. Dry area afterwards with a dry, clean, lint-free cloth.

CAUTION

Do not get alcohol on the rubber parts or sealants. Alcohol may cause rubber parts to deteriorate and may cause some sealants to dissolve.

4. *Electrical Parts.* Use trichloroethane, Federal Specification O-T-620. Wipe with a clean soft cloth.

5. *Rubber Parts.* Remove dirt from surfaces with a clean, lint-free cloth dampened with water and a mild soap. Dry, using a dry, clean, lint-free cloth.

6. *Glass.* (Except nightsight front lens and ITA front lenses)

CAUTION

Do not clean glass surfaces of optical instruments with rags or other materials that might scratch and thereby degrade system performance.

CAUTION

The nightsight front lens has a special coating and is not to be treated as glass.

Use a camel hair brush to remove loose particles of dust and lint from glass surfaces. Then blot the surface using lens tissue-either dry or moistened with denatured alcohol. If dirt, lint, or smears remain on the glass, wrap a piece of lens tissue around the end of an orange stick (or equivalent) to form a swab. Beginning at the center of the surface, swab with a circular motion while applying a light downward pressure. Gradually increase the radius of the area being cleaned until the entire surface has been covered. If necessary, use a rubber syringe to remove any remaining dust or lint.

TA 158965

GENERAL CLEANING INSTRUCTIONS

6.1 *Machinegun.* Clean and lubricate machinegun in accordance with TM 9-1005-224-10.

CAUTION

Do not lubricate the gas cylinder interior or the gas piston.

6.2 *Driver's Hatch.* Clean components as follows:

a. Remove any large pieces of debris from yoke support assembly and insert block detents.

b. Clean areas with a stiff acid brush and dry cleaning solvent; then wipe dry with cheesecloth.

c. After cleaning, lubricate in accordance with lubrication instructions in LO 9-2350-259-12.

6.3 *ITA Front Lenses.* Clean ITA front lenses as follows:

CAUTION

Excessive accumulation of dust and sand will degrade the performance of the ITA.

a. Using a squeeze bottle filled with optical lens cleaning compound, item 4, Appendix D, or denatured alcohol, item 1, Appendix D, and water solution, flush the lens surface until all foreign material is washed away.

NOTE

Potable water may be used if above items are not available.

b. Blot dry with lens paper, item 17, Appendix D, or equivalent.

NOTE

Adapters which go between ITA front lenses and nightsight and between daysight/tracker and ITA are designed to exclude light. They also protect lenses from dust and sand and shall be kept in place at all times.

TA 158966

GENERAL CLEANING INSTRUCTIONS

7. *Nightsight Front Lens.*

CAUTION

Cleaning front lens surface with rags or any materials or methods other than as specified below will degrade nightsight performance.

a. Flush off dirt and other debris using potable water (clean water suitable for drinking).

b. Thoroughly moisten a pad of cotton from nightsight lens cleaning kit with lens cleaning solution.

c. Apply lens cleaning solution to lens by dabbing lightly (do not rub) until lens surface is evenly covered.

d. Wait one to three minutes depending on condition for solution to loosen heavy contamination. (Do not allow solution to dry.)

e. Flush off the solution with potable water.

f. Repeat steps a through d until heavy contamination is removed.

CAUTION

Wiping motion should be accomplished in one direction only. The pad thus contaminated should be immediately discarded and not used for further cleaning.

g. Clean lens in small sections by applying cleaning solution and gently wiping with clean pad.

h. Rinse lens with potable water.

i. Dry lens by wiping lightly in a single direction only with clean cotton pad.

j. During freezing weather the lenses may be cleaned by using warm (not hot) potable water and cleaning solution.

8. *Cleaning Procedures for Cold Weather Operation.*

a. If the temperature is below +32°F, add glycerin to cleaning water. This will prevent it from freezing on the part being cleaned.

b. Alcohol, applied with a lens tissue, may be used to clean glass surfaces if dry lens tissue does not work satisfactorily.

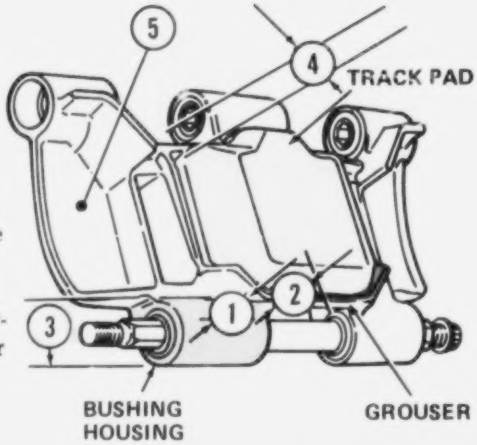
c. If moisture has frozen on glass surfaces, apply de-icer or place the component in a warm area until the ice melts. Then pat the surface with a clean absorbent wiping rag. DO NOT RUB. Clean with lens tissue when the surface is dry.

TA 071011

MAINTENANCE OF TRACKS

INSPECTION OF TRACKS

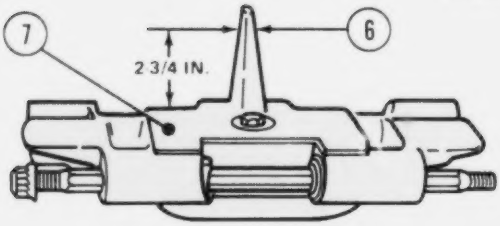
The vehicle has either a T130 track or T130E1 track, or a mixture of both. The inspection must determine what kind of track shoes are installed to check track bushing wear. The surest way to tell is to measure the length of the track shoe pad front-to-back at the middle of the pad. A T130E1 pad is about 4-3/4 inches long, a T130 pad is about 5-1/4 inches long. Use the information below and on the next page for inspecting the track.



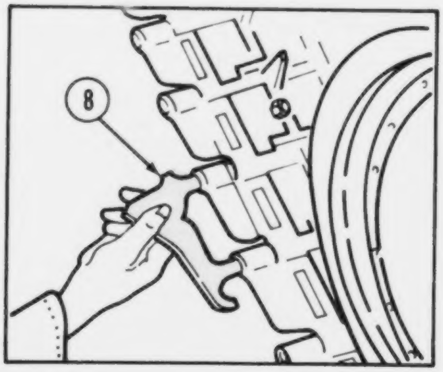
WHAT TO MEASURE	HOW TO MEASURE IT
1. Grouser Height	Measure the height of the top edge of the grouser above the bushing housing. If the shoe has less than 1/4 inch of grouser height left, it's no good.
2. Track Shoe Pad	Measure the height of the top of the track shoe pad above the top of the grouser. If this is less than 1/16 inch, the pad is too worn for that shoe. If the shoe is OK otherwise, discard the pad; it will damage a paved road.
3. Drive Sprocket Flange (leading)	On the two-bushing end of the shoe, measure the distance from the edge of the sprocket drive hole to the outside of the bushing housing. If the distance is less than 1-15/16 inch, the shoe is too worn to keep.
4. Drive Sprocket Flange (trailing)	At the three bushing end of the shoe, measure from the edge of the sprocket drive hole to the nearest outside edge of the shoe. If it's less than 1/2 inch, the shoe is no good.

TA 071012

5. Track Shoe Forging	Look for cracks in the grousers, pad recess, the "ears" (track web area outside the grousers and sprocket drive holes), and the sides of the sprocket drive holes. If there are cracks less than 1 inch long in these plates, get the cracks welded. If cracks are 1 inch or longer, or in any other place, notify organizational maintenance.
6. Center Guide	The center guide has to be 1/8 inch thick or more measured 2-3/4 inch from the face of the track. And, of course, it has to be at least 2-3/4 inches long.
7. Rubber Inserts	Look at the rubber inserts that bear on the road wheels. If there is 3/8 inch or more separation between the rubber and metal all the way around, or if the insert shows chunking 1/2 inch or more deep on 10 percent or more of its surface, notify organizational maintenance.



8. Bushing Wear	With the track on the vehicle and under normal tension, insert pins of gage into shoes. If pins freely enter both shoes, track bushings are OK; if pins do not freely enter both shoes, bushings are worn. Notify organizational maintenance.

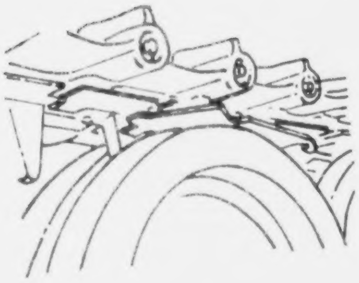


TA 158967

MAINTENANCE OF TRACKS

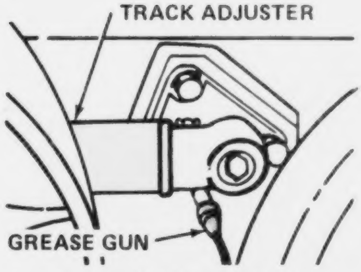
CHECKING TRACK TENSION

To check the tension on the M901/M113A1 or the M901A1/M113A1 vehicle, measure the distance between the top of the second roadwheel from the front and the bottom of the track on each side of the vehicle. Drive the vehicle onto smooth, level ground and let it coast to a stop without using the brakes. Measure with gage, Part No. 12253280. Place gage on top of second roadwheel and adjust track tension until the bottom of the track touches the gage and rests on the third roadwheel. If the track tension is off, pump GAA into the lubrication fitting on the track adjuster to tighten the tension, or bleed grease out through the bleed valve to loosen the tension.

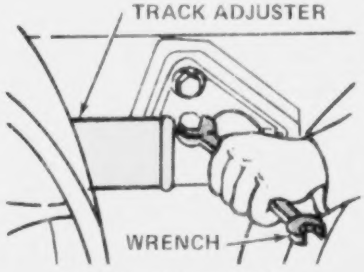


NOTE

If the track adjuster is extended to its maximum limit of 17 inches and the track is still too loose, remove one track shoe and readjust the track tension.



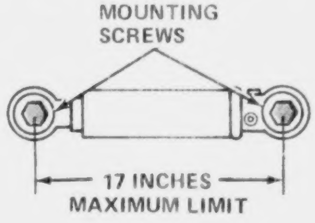
TIGHTENING TENSION



LOOSENING TENSION

CAUTION

If the track adjuster is extended beyond 17 inches (measured between center of each mounting screw), it will be damaged during vehicle operation.



MEASURING TRACK ADJUSTER LIMIT

TA 159243

MAINTENANCE OF TRACKS

On the M901/M113A2 or the M901A1/M113A2 vehicle, the minimum amount of track tension measures 1/2 inch between the top of the number two roadwheel and the bottom of the track touching the top of the number three roadwheel. However, the track tension can measure more than 1/2 inch as long as the track lightly touches the top of the number three roadwheel. To check track tension, drive the vehicle onto smooth, level ground and coast to a stop without using the brakes. Partially remove the track shroud to expose the number two and three roadwheels. Insert the handle (1/2 inch diameter) of the drive pin punch (item 27, appendix B) between the top of the number two roadwheel and the bottom of the track. If the handle can be inserted freely without touching the top of the roadwheel or the bottom of the track and the track touches the top of the number three roadwheel, no adjustment is required. If the handle cannot be inserted freely between the top of the number two roadwheel and the bottom of the track, pump GAA grease into the track adjuster fitting and increase tension. Increase tension until the handle fits without interference and the track lightly touches the top of the number three roadwheel. If the handle can be inserted freely between the top of the number two roadwheel and the bottom of the track, but the track does not touch the top of the number three roadwheel, bleed grease from the track adjuster fitting and decrease tension. Decrease tension until the handle fits without interference and the track lightly touches the top of the number three roadwheel. Install track shroud.

TA 159244

MAINTENANCE OF TRACKS

NOTE

The grease gun and wrench are basic issue items. Wipe off the waste grease after loosening the track tension. If the track adjuster is in as far as it will go and the track is still too tight, add one track shoe and readjust the track tension.

REMOVING AND INSTALLING TRACK PAD

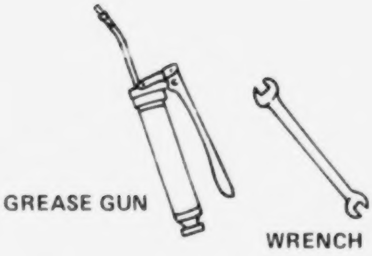
The track pad is attached by a built-in stud and one nut. To take off the pad, unscrew the nut and pry the pad out of the hole in the shoe. If it's really stuck, encourage it with a hammer to the end of the stud. Take care not to damage the threads if they are to be used again. To put the pad back, just put it in the track shoe with the stud sticking through, and screw down the nut. Tighten the nut and have organizational maintenance check for the proper torque as soon as possible.

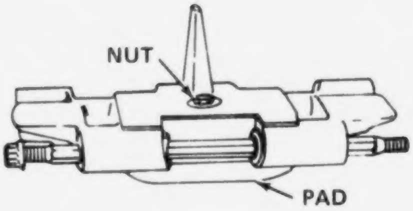
REPLACEMENT OF TRACK SHOES

1. Disconnect tracks as follows:

    (a) Drive vehicle onto level, hard surface and position track shoe to be removed midway between sprocket and first road wheel from front, or halfway between idler and fifth road wheel. Do not lock vehicle brakes.

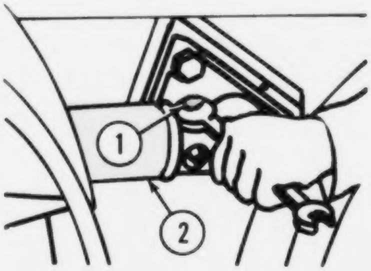
    (b) Put chocks in front and back of tracks on other side of vehicles.





NOTE

Pads and nuts are not interchangeable for the T130 and the T130E1 track. T130 pads are about 5-1/4 inch long, and T130E1 pads are about half an inch shorter. Use the right pad and matching nut.

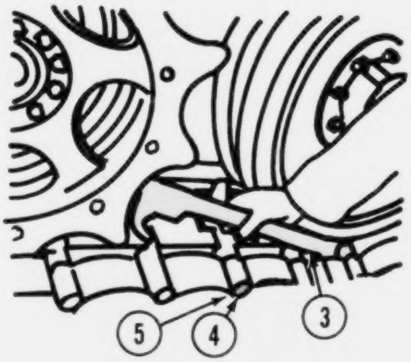


(c) Turn bleeder valve (1) on track adjuster (2) counterclockwise, to relieve tension on tracks.

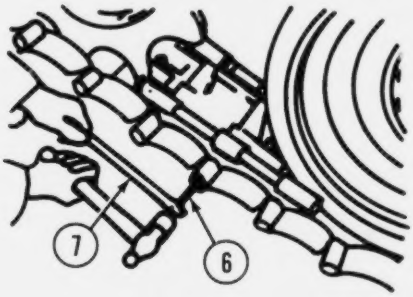
TA 071015

MAINTENANCE OF TRACKS

(d) Attach two track connecting fixtures (3) 19207-12253183 across track shoe to be removed (one inside and one outside). Tighten fixtures evenly to relieve tension on track pin (4) to be removed.



(e) Remove track pin nut (5) from outer end of track pin.



(f) Start removing track pin, using short leg of drift pin (6) 11678718, and remove track pin with long leg of drift pin (7).

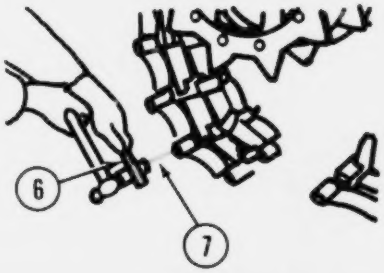
(g) Loosen and remove track fixtures from track.

2. Remove track shoes as follows:

(a) Disconnect track as above.

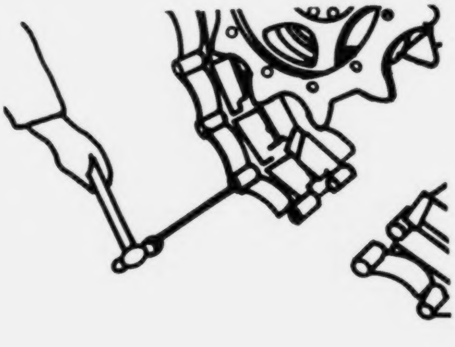
(b) Remove track pin nut from outer end of track pin.

(c) Start track pin, using short leg of drift pin (6) 11678718, and remove track pin with long leg of drift pin (7).



(d) If shoe was taken out because track was too long, connect track and adjust tension. (See page 3-44.)

(e) Install removed track pin and two nuts on track shoe, and stow track shoe on vehicle.



TA 071016

MAINTENANCE OF TRACKS

3. Install track shoe as follows:

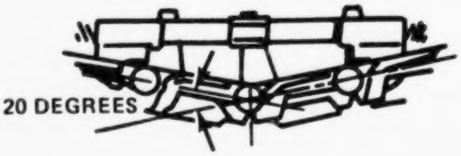
   (a) Disconnect track.

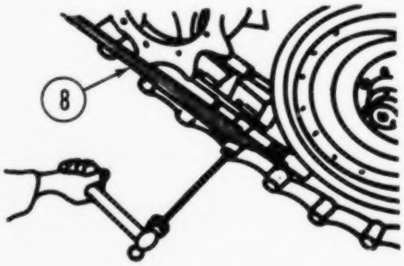
   (b) Remove track shoe from stowed position on vehicle, and remove track pin and both pin nuts from shoe.

   (c) Coat track with corrosion preventive compound, MIL-C-16173, Grade 1, and install nut on one end flush with end of pin.

   (d) Position track shoe on track, aline track pin holes with 20-degree angle between shoes, and install track pin.

   (e) Install inner track pin nut, and tighten both track pin nuts, so that at least 1/8-inch of pin extends out beyond each nut. Have organizational maintenance check the torque at the earliest opportunity.





4. Connect track as follows:

   (a) Pull track ends together, and install two track connecting fixtures 19207-12253183 across track shoes to be connected.

   (b) Coat track pin with corrosion preventive compound, MIL-C-16173, Grade 1, and install nut on one end flush with end of pin.

   (c) Aline track shoe bushing, tighten track connecting fixtures to obtain 20-degree angle between track shoes with track pin holes alined, and install track pin.

NOTE

Use crowbar (8) to obtain correct angle.

TA 071017

MAINTENANCE OF TRACKS

(d) Install inner race track pin nut, and tighten both track pin nuts. Have organizational maintenance check for torque at earliest opportunity.

NOTE

A minimum of 1/8-inch of track pin must extend through both track pin nuts.

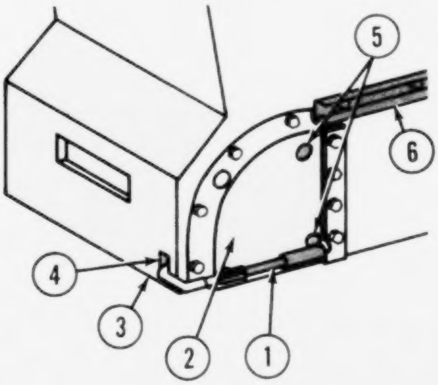
(e) Loosen and remove two track connecting fixtures from track.

(f) Adjust track tension.

TRACK SHROUD REMOVAL, STOWAGE, AND INSTALLATION

NOTE

When operating in very muddy terrain it may be necessary to remove and stow the track shrouds. The instructions here apply only to situations where the shrouds are removed for stowage.



Removal. To remove the shroud, proceed as follows:

1. Position track connecting fixture 19207-12253183 (1) between rear shroud cover (2) and rear fender (3), and tighten fixture to relieve pressure on four capscrews securing rear cover to fender. (Engage one end of fixture in square cutout (4) in fender and the other end in either upper or lower round cutout (5) in rear shroud cover.)
2. Remove four screws and washers securing rear cover to hull.
3. Remove track fixture.
4. Remove eight capscrews and washers, securing two retainer strips (6) and shroud to hull.
5. Remove 4 capscrews on front shroud cover securing cover to hull.
6. Remove two retainer strips (6) and shroud from vehicle.
7. Repeat procedure to remove shroud from other side.

TA 071018

MAINTENANCE OF TRACKS

Stowage. To stow the shroud, proceed as follows:

1. Invert right side shroud and position on left side of vehicle. (In this position, the right rear cover will be directly above the left rear fender and the right front cover will be above the left front hull.)

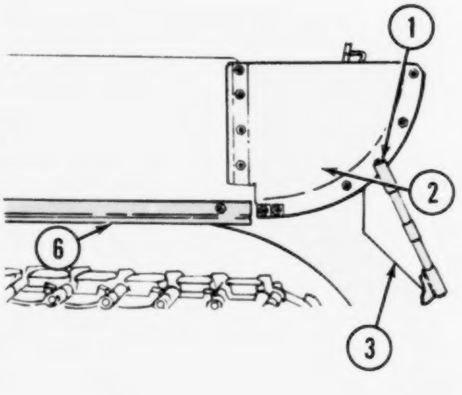
2. Install, but do not tighten, two capscrews and washers securing right front cover to hull.

3. Install, but do not tighten, one capscrew and washer in one of center holes of shroud to support shroud weight while installing rear cover.

4. Position track connecting fixture (1) between rear shroud cover (2) and rear fender (3) and tighten fixture to aline holes.

5. Install capscrews and washers securing rear cover (2) to fender (3).

6. Remove capscrew and washer installed in center of shroud; position two retainer strips (6), and install eight capscrews and washers to secure shroud to hull.



7. Tighten all 12 capscrews.

8. Repeat procedures for stowing left shroud on right side of vehicle.

NOTE

With both shrouds in stowed position, eight capscrews and washers are not in use. Retain the capscrews in the vehicle so they can be used to install the shroud in the normal position.

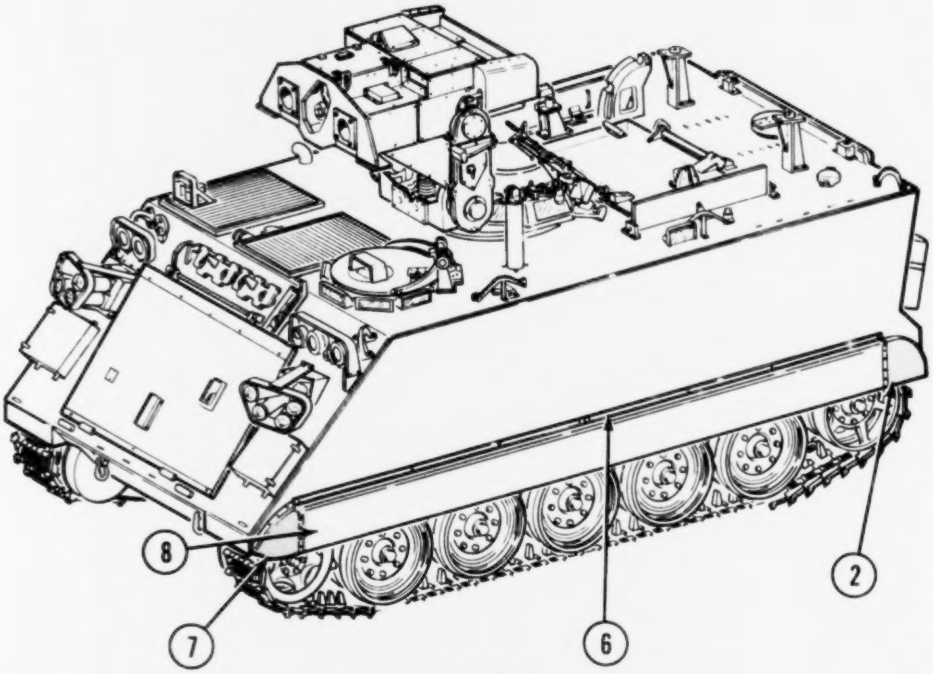
Installation. To install the track shroud, proceed as follows:

1. Remove shrouds from stowed position by reversing the procedures for installing shrouds in the stowed position.

2. Position left shroud assembly (8) on left side of vehicle.

3. Install, but do not tighten, four washers and capscrews holding left front cover (7) to vehicle.

TA 071019



4. Position two retainer strips (6) and install, but do not tighten, eight washers and capscrews holding strips and washers to vehicle.

5. Position track connecting fixture between left rear cover (2) and fender, and tighten fixtures until holes in cover aline with threaded holes in fender. Install four washers and capscrews.

6. Remove track fixture, and tighten all 16 capscrews securing shroud to vehicle.

7. Repeat steps 3 through 7 to install right side shroud assembly.

TA 071020

MAINTENANCE OF AIR CLEANER

WARNING

To avoid injury to personnel, contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel (chemical environment).

WHEN TO CLEAN AIR CLEANER.

Clean the air cleaner as follows:

After operation in dust and sand.

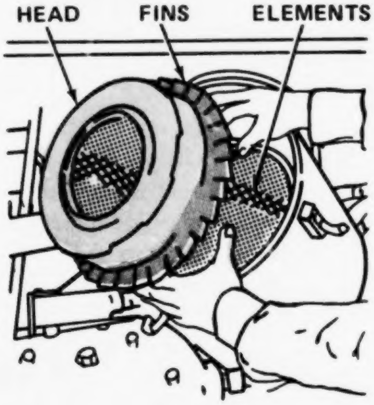
At any time the air cleaner restriction indicator shows red.

At designated intervals.

REMOVING THE AIR CLEANER ELEMENT

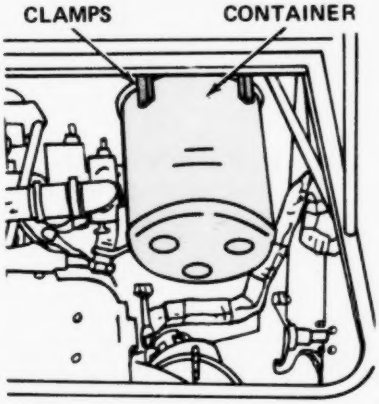
To remove the air cleaner element, proceed as follows:

1. Unfasten four clamps securing element container to air cleaner head. While unfastening clamps, hold container so it does not drop.
2. Remove container.



CAUTION

Operation with a dirty or improper air cleaner element can cause severe engine damage due to overheating or abrasive action. Make sure element is clean, properly installed, and matches air cleaner assembly.



3. Lift element out of it's container.

CLEANING THE ELEMENT

Clean the element by jarring, if time is short, otherwise clean by washing or use compressed air.

WARNING

Do not clean element with gasoline, diesel fuel, or other flammable liquids.

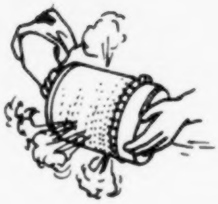
TA 158968

MAINTENANCE OF AIR CLEANER

CLEANING THE ELEMENT

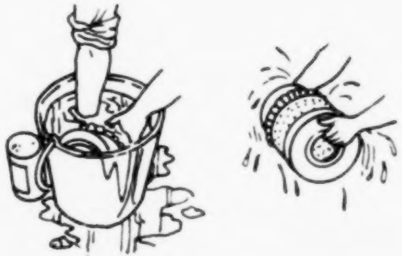
Cleaning by Jarring. To clean by jarring, proceed as follows:

1. If it's an open-end element, tap the fins gently with the hand to knock the dirt loose, then shake it out the ends. Go easy; don't damage the fins. Don't hit or drop the element on its ends.



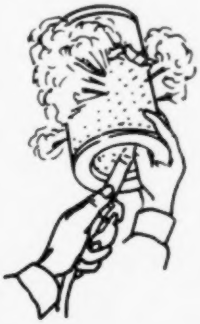
2. If it's a closed-end element, tap the sides gently with the hands, then shake the dirt out the end.

Cleaning with Water. Wash the element with warm water and mild soap. Make sure it's dry before putting it back in the vehicle.

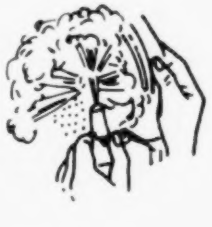


Cleaning with Compressed Air. To clean with compressed air, proceed as follows:

> **WARNING**
>
> **Wear safety goggles when using compressed air. Don't point the stream of air at yourself or anyone else.**



1. If it's an open-end element, direct compressed air no more than 30 psi to clean filter.



2. If it's a closed-end element, direct 100 psi compressed air through the element from the inside to outside.

TA 157949

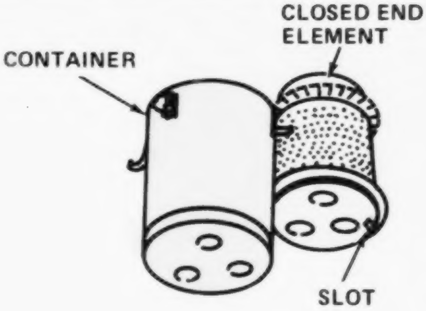
MAINTENANCE OF AIR CLEANER

INSTALLING THE AIR CLEANER ELEMENT

CAUTION

Two non-interchangeable air cleaners are used on the vehicle. Be sure to install the right element and container.

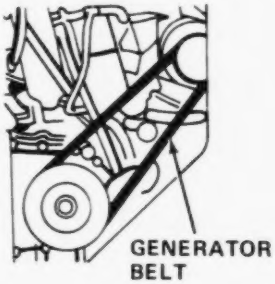
1. If it's an open-end element, just slide it back into the container. It doesn't matter which end goes in first.
2. If it's a closed-end element, put it in with the closed end down. Turn the element until the slot on the bottom is between the stops in the container.

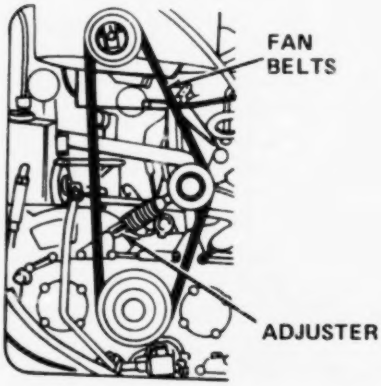


3. Hold the container under the air cleaner head and latch the four clamps.

CHECKING TENSION OF DRIVE BELTS

1. Open the power plant compartment rear access panel and check the generator belt and the fan belts for wear and proper adjustment.



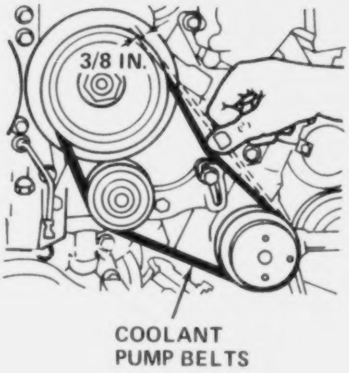


The end of the rod in the adjuster should be between the marks on the adjuster. If it is out of adjustment or if belts are badly worn or missing, report it to organizational maintenance.

TA 071023

CHECKING TENSION OF DRIVE BELTS

2. Open the power plant compartment door and check the coolant pump drive belts. Press on each belt halfway between the pulleys. If the belts move more than 3/8 inch or if belts are badly worn or missing, tell organizational maintenance. (3/8 inch is just about the width of the belt.)



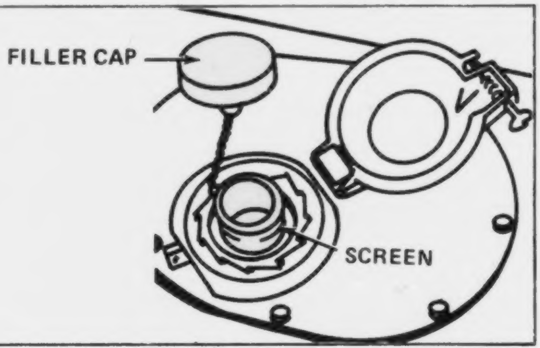
MAINTENANCE OF FUEL SYSTEM

REFUELING

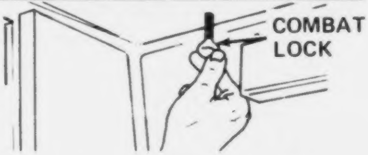
1. Shut off the engine.

WARNING

Diesel fuel will burn. Don't smoke or allow smoking or open flame near the vehicle while refueling.



2. Unlock combat lock.
3. Clean off any dirt that could get into the filler neck.
4. Unscrew the filler cap.
5. Check the screen in the filler neck. If there's any dirt in the screen, take the screen out and clean it. Put the screen back before refueling.
6. Fill up. Allow 5 inches in the filler neck for expansion. Make sure there is metal-to-metal contact between the nozzle and the filler neck.



7. When tank is full, take out the fuel nozzle and screw on the filler cap. Be sure the keeper chain is all inside, so the cap goes on tight.
8. Close and lock the exterior filler cover.
9. Lock the cover from inside the personnel compartment by turning thumbscrew on ceiling.

TA 071024

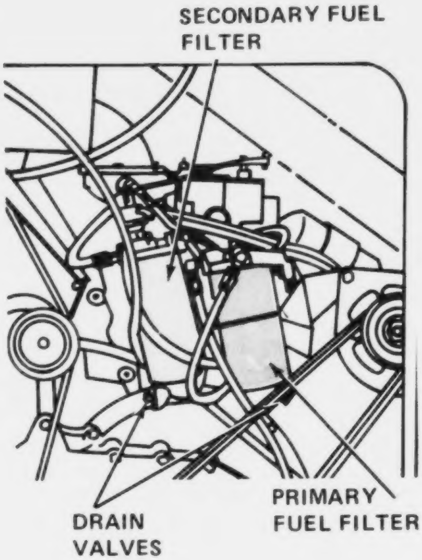
MAINTENANCE OF FUEL SYSTEM

DRAINING FUEL FILTERS

CAUTION

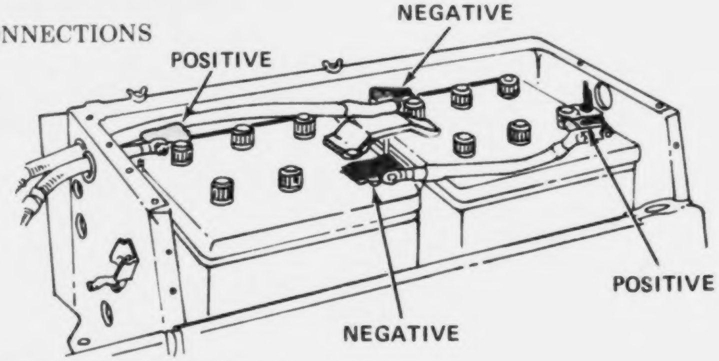
Open the drain valves slowly, so that fuel isn't sprayed all over the power plant.

With the engine shut off, hold a container under each drain valve. Slowly open each valve and let it run until all the water is drained. When clean fuel starts to run, close the valve.


SECONDARY FUEL FILTER
DRAIN VALVES
PRIMARY FUEL FILTER

MAINTENANCE OF BATTERIES

LOOSE CONNECTIONS


NEGATIVE
POSITIVE
POSITIVE
NEGATIVE

WARNING

Batteries give off hydrogen gas which is explosive. Always disconnect the ground cable first and connect it last. Make sure the polarity (+ and – connections) is right.

1. Open the cover on the battery box located in the right rear of the personnel compartment.
2. Connectors should be tight and all the way down on the battery posts.
3. Battery hold-downs should be tight enough to keep the batteries from slipping and sliding.

TA 071025

MAINTENANCE OF BATTERIES

4. Coat the connectors with grease GAA. If any nuts or screw threads are corroded, notify organizational maintenance, and if authorized, clean them.

5. Check the cables for loose or broken connections.

6. Close the cover and latch it securely when finished.

ELECTROLYTE LEVEL

1. Never let the electrolyte level go below the tops of the battery plates. If low, notify organizational maintenance, and if authorized, add distilled water to fill each cell to the full mark.

NOTE

If there is no distilled water, use clean rain water. Bottled drinking water is a third choice, if there is nothing else. The mineral salts in ground water can destroy the batteries in no time. Don't keep battery water in a metal container.

2. If the temperature is below +40°F, charge the batteries by running the engine for 15 minutes right after water is added. Charging will mix the water with the electrolyte and reduce the change of the batteries freezing.

3. Check the electrolyte level more frequently in hot weather.

WARNING

Batteries produce explosive gas and corrosive acid. To avoid sparks remove ground cable first and connect ground cable last. Provide ventilation and do not smoke when replacing or servicing. Avoid contact between acid and eyes or skin; if contacted wash with clean water and seek medical aid at once.

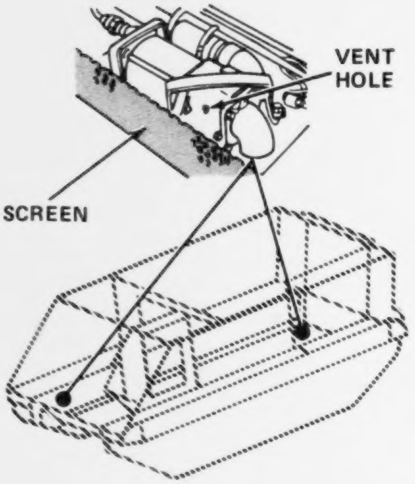
4. For more information on the batteries, see TM 9-6140-200-14.

TA 071026

MAINTENANCE OF BILGE PUMPS

BILGE PUMP SCREENS

The forward bilge pump is in the right corner of the power plant compartment. The rear pump is under the floor plates, at the rear right side. Each pump has an inlet screen. If the screens get blocked, the pumps cannot suck water. Clear away any debris, and keep the bilges cleaned out.

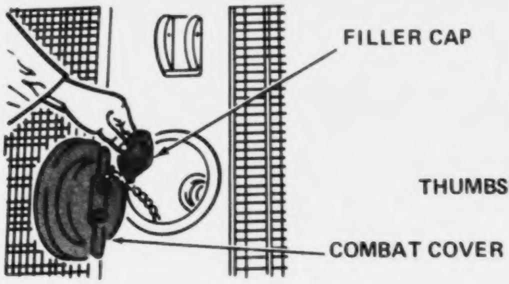


VENT HOLES

Each bilge pump has a vent hole that has to be kept clean. If the vent hole gets clogged, the pump could be airlocked. To clean the vent holes, just run a wire back and forth in each hole a few times. Take off the floor board to get to the rear pump. Make sure to replace it when finished.

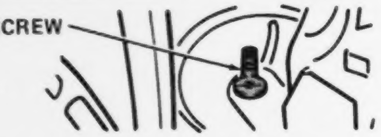
MAINTENANCE OF COOLING SYSTEM (M901/M113A1 AND M901A1/M113A1)

RADIATOR COOLANT LEVEL



WARNING

If the cooling system is hot, open the coolant filler cap slowly until all pressure is gone. Don't touch the hot cap with bare hands. Never take this cap off if the engine is overheated.



Remove the filler cap and check the level of coolant in the radiator. Coolant should be even with the bottom of the filler tube neck. Add coolant to fill the radiator if the coolant level is low.

CAUTION

If water is added ask organizational maintenance to check anti-freeze protection level.

Lock the combat cover during combat with the thumbscrew located inside the power plant compartment. Ask organizational maintenance to check and add anti-freeze to winterize vehicle prior to the onset of cold weather.

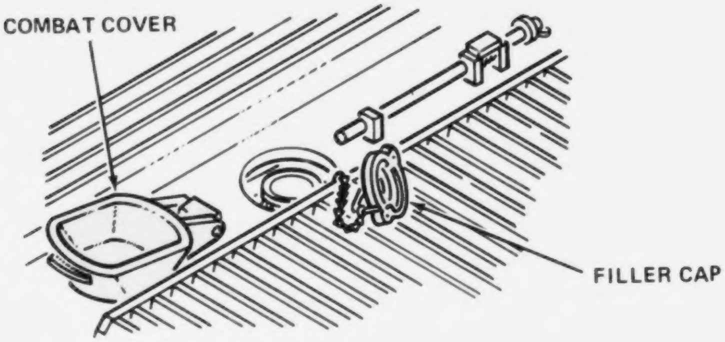
TA 159245

MAINTENANCE OF COOLING SYSTEM (M901/M113A2 AND M901A1/M113A2)

RADIATOR COOLANT LEVEL

WARNING

If the cooling system is hot, open the coolant filler cap slowly until all pressure is gone. Don't touch the hot cap with bare hands. Never take this cap off if the engine is overheated.

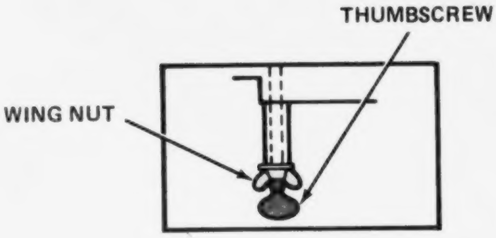


Remove the filler cap and check the level of coolant in the auxiliary radiator tank. Coolant should be within 1/2 inch of filler tube neck. Add coolant as needed.

CAUTION

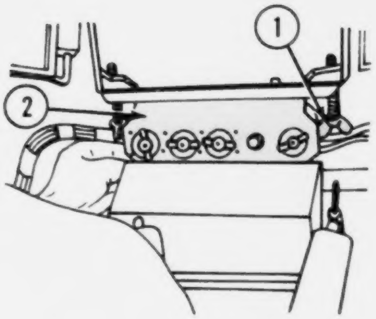
If water is added ask organizational maintenance to check anti-freeze protection level.

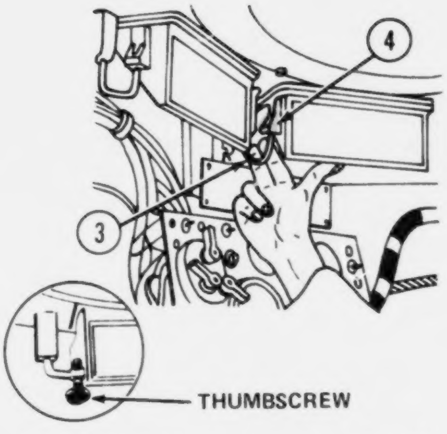
Lock the combat cover during combat with the thumbscrew located inside the power plant compartment. Ask organizational maintenance to check and add anti-freeze to winterize vehicle prior to the onset of cold weather.



TA 159246

REPLACEMENT OF M17 PERISCOPES





The M17 periscopes (4 around the driver's hatch) enable the driver to operate the vehicle with hatch closed. A spare periscope is provided and is stored on the right sponson in front of the missile rack to replace any periscope which has become unusable.

INSTALLATION.

1. Install the periscope that goes above the warning lights panel (2) by loosening the wingnuts (1), pushing panel forward, and carefully inserting periscope up into position. Tighten the wingnuts and release panel.

2. Install other periscopes by inserting them into position, pulling down spring-loaded retaining hooks (3) and placing them under the retaining ears (4).

NOTE

Some later models use a thumbscrew instead of a hook.

REMOVAL.

Remove periscope in the reverse order of installation.

TA 157952

MISSILE GUIDANCE SET (MGS) BATTERY

TEST AND INSPECTION

The MGS battery test and inspection consists of a visual check for physical damage and an operational test under load in step 1 of the MGS self-test, page 2-148 on M901, and page 2-156.2 steps 8 and 14 on M901A1 system.

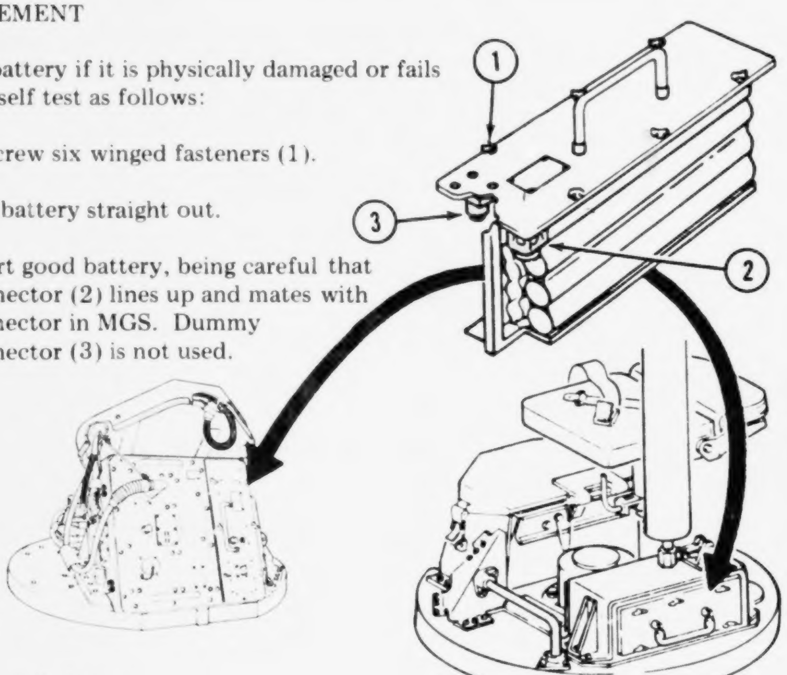
NOTE

On later model vehicles, the MGS battery has been replaced with the TOW vehicle power conditioner (TVPC). MGS battery is still used on ground system and in case of TVPC malfunction.

REPLACEMENT

Replace battery if it is physically damaged or fails the MGS self test as follows:

1. Unscrew six winged fasteners (1).
2. Lift battery straight out.
3. Insert good battery, being careful that connector (2) lines up and mates with connector in MGS. Dummy connector (3) is not used.



4. Secure fasteners.
5. On M901 system, perform step 1 of MGS self-test. (See page 2-143 of this TM.)
6. On M901A1 system, perform steps 1, 2a, and 2b of procedure on page 2-156.2.

TA 159247

EMERGENCY POWER BATTERY

TEST AND INSPECTION

NOTE

Emergency power battery serves as both a source of control power when turret power fails and as a spare MGS battery.

1. Visually inspect battery for signs of damage and wear.
2. Test battery periodically by placing it in the MGS and performing step 1 of the MGS self-test, page 2-148 on M901, and page 2-156.2 steps 8 and 14 on M901A1 system.

REPLACEMENT

Replace battery if test indicates that battery charge is low.

DAYSIGHT/TRACKER

TEST AND INSPECTION

Inspection of the daysight/tracker consists of a visual check for obvious physical defects and wear. The daysight/tracker is tested operationally in the MGS SELF TEST covered in Chapter 2, Operation Under Usual Conditions.

REPLACEMENT

Replace daysight/tracker if damaged or worn beyond use, or if it fails the self-test. (See page 2-135 for replacement.)

NIGHTSIGHT

TEST AND INSPECTION

Perform a visual inspection for obvious physical damage prior to installation and upon removal and storage. Test the nightsight in accordance with procedures on page 2-141 or 2-156.2 as applicable.

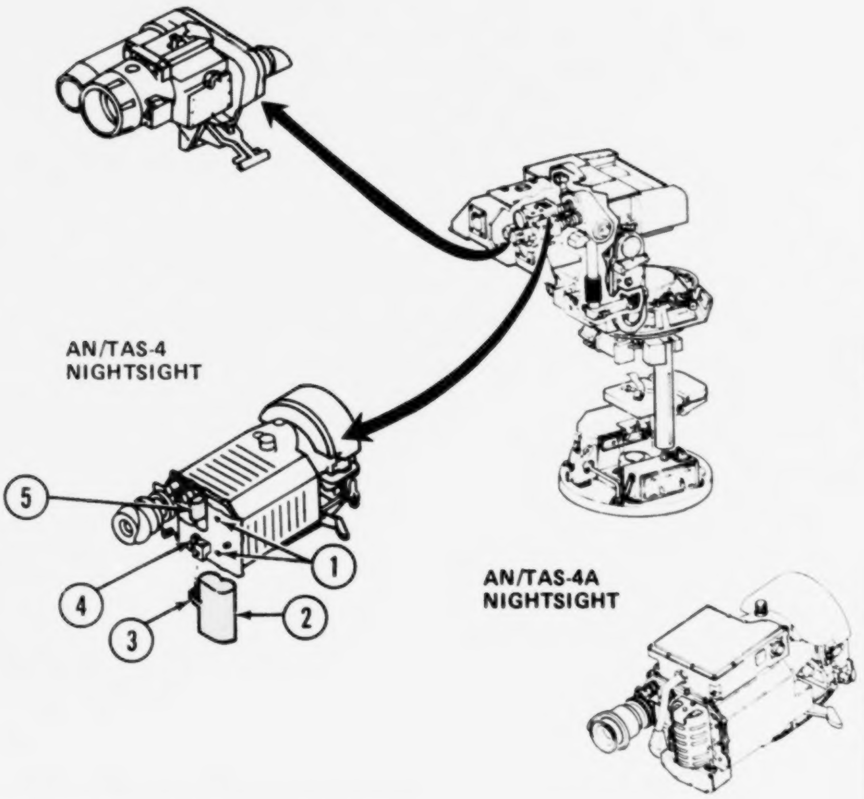
INSTALLATION AND REMOVAL

Install and remove nightsight in accordance with procedures on pages 2-137 and 2-143, respectively.

TA 159248

NIGHTSIGHT

INSTALLATION AND REMOVAL



REPLACEMENT OF BATTERY (M901)

Battery monitor in nightsight indicates when charge is down to less than 10 minutes of continuous operation of the nightsight and that battery should be charged or replaced as soon as operational situation permits. Replace battery as follows:

1. Turn nightsight actuator to the OFF/LOCK position.

2. Push in on latch (4) and remove battery (2) by applying light pressure on top. Hold a hand under it to keep it from falling.

3. Take good battery, line up guide pins (1) with guide holes in battery.

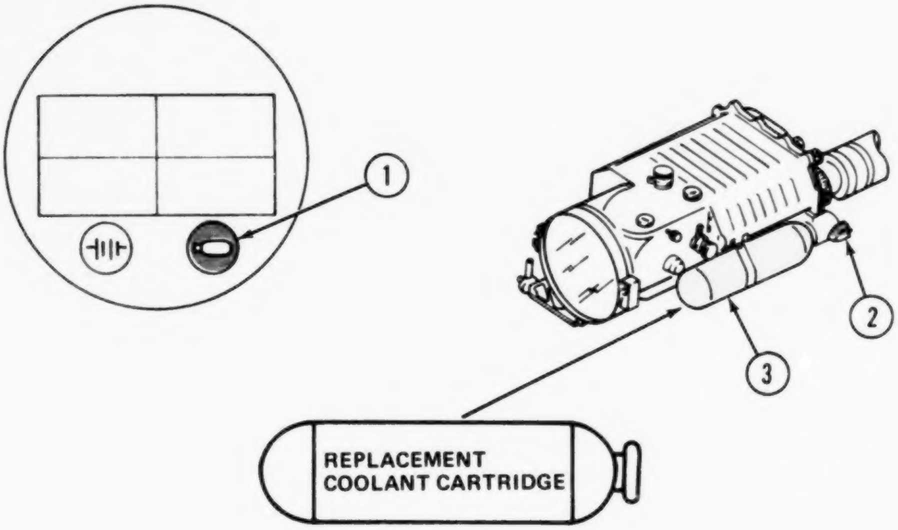
4. Push battery up making sure connector on battery (3) mates firmly with socket (5) on nightsight, and place latch handle under battery to keep it firmly in place.

TA 159249

NIGHTSIGHT

REPLACEMENT OF COOLANT CARTRIDGE (M901)

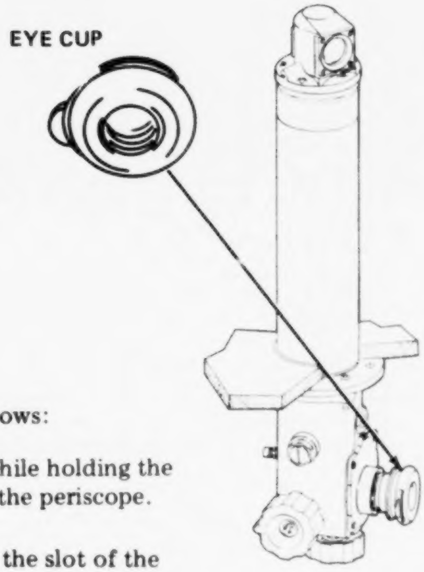
Nightsight coolant cartridge (3) should be replaced when coolant monitor (1) in sight picture of nightsight lights while operating or testing the nightsight. Replace empty cartridge with a good cartridge as follows:



1. Place actuator switch (2) to RELEASE while holding the empty cartridge.
2. Pull cartridge straight out.
3. Insert new cartridge and turn actuator switch to OFF/LOCK to secure in position.
4. Check new bottle in AIR/BATT CHECK position. Sight picture should be as shown. Monitors should not be illuminated.

TA 159250

SQUAD LEADER'S PERISCOPE



TEST AND INSPECTION

Periscope is checked before operation for physical damage, and wear and tear. It also receives an operational check (see preventive maintenance checks and services, table 2-1).

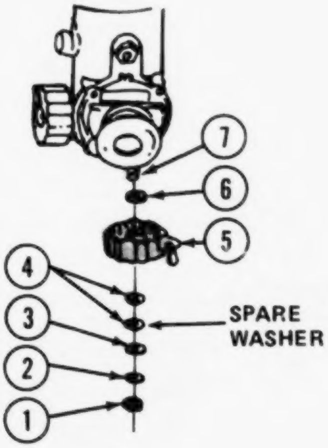
REPLACEMENT OF EYE CUP

Replace eye cup if missing or worn as follows:

1. To remove, rotate it ccw, 1/8 turn while holding the focusing ring, and pull it away from the periscope.
2. To install it, insert the two tabs into the slot of the eyepiece and turn the eye cup 1/4 turn cw.

SHEAR ELEMENT REPLACEMENT

1. Remove nut (1) while holding shaft (7) with screwdriver.
2. Remove lockwasher (2), flatwasher (3), and 2 tabwashers (4) from handwheel (5). Handwheel (5) and washer (6) do not require removal from shaft (7).
3. Replace defective tabwasher (4) (shear element) with spare.
4. Install flatwasher (3), lockwasher (2), and nut (1). Tighten nut (1) until snug.
5. Replace spare washer as soon as possible.



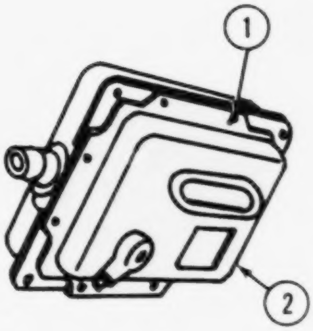
TA 071032

INDICATOR LAMPS REPLACEMENT

DOMELIGHT LAMPS

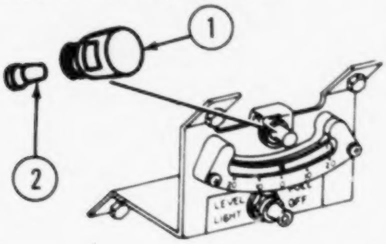
Replace domelight as follows:

1. Take out eight cover screws (1) and pull off cover plate (2).
2. Replace bad bulbs.
3. Put cover plate back on.
4. Check and see if it works.



HEATER LAMPS, DRIVER'S AND GUNNER'S LEVEL INDICATOR LAMPS, SMOKE GRENADE AND TURRET POWER INDICATOR LAMPS, READY TO LOAD LIGHT LAMP AND INTERCOM ON/OFF INDICATOR LAMP

Typical of all items covered in this paragraph.



Replace all of the above lamps in the same manner as follows:

1. Unscrew entire light assembly (1).
2. Pull bad lamp (2) out the back of the assembly and insert good one.
3. Screw assembly back in socket, fingertight.

WARNING

Do not press the FIRE switch when testing the smoke grenade power lamp.

4. Perform an operational test of the new lamp.

NOTE

The TURRET POWER indicator on the gunner's control panel and the READY TO LOAD light on the fire interrupt/intercom assembly do not require an operational test since both have a "press-to-test" feature. To light the TURRET POWER indicator, set the vehicle MASTER SWITCH to ON and depress the lamp cover. To light the READY TO LOAD light, set the vehicle MASTER SWITCH and the TURRET POWER switch to ON then depress the lamp cover.

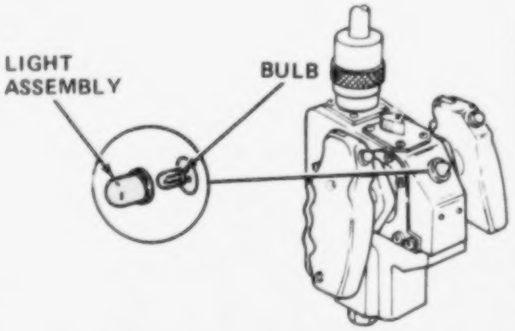
TA 157954

INDICATOR LAMPS REPLACEMENT

TRIGGER LIGHT

WARNING

Make sure launcher is not loaded with live missiles.



1. Unscrew light assembly.
2. Pull bulb out the rear of the assembly.
3. Insert good bulb.
4. Replace assembly fingertight.
5. Test light by applying turret power, selecting and arming a missile, and pressing trigger switch.

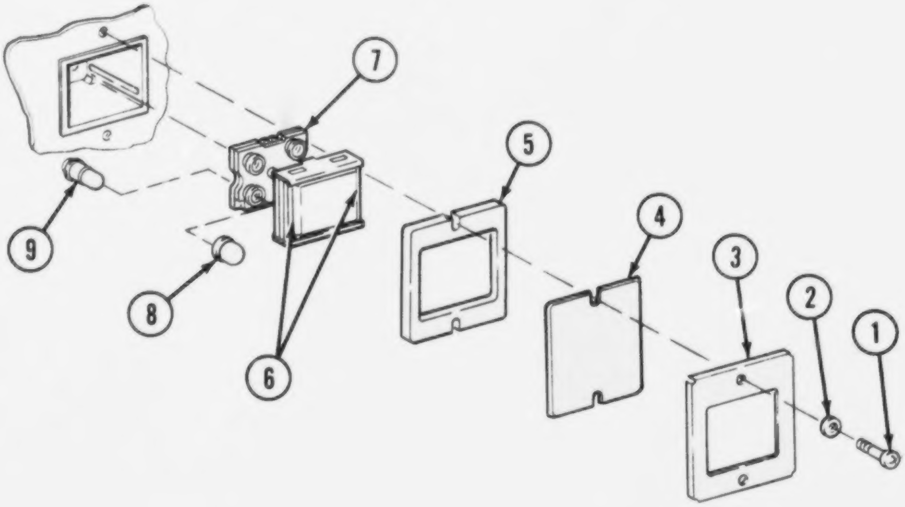
TA 157955

INDICATOR LAMPS REPLACEMENT

GUNNER'S CONTROL PANEL STATUS INDICATOR LAMPS

Replace status indicator lamps as follows:

1. Using a number one cross tip screwdriver, remove two screws (1) and two washers (2).
2. Remove light cover retainer (3), light cover (4), and light cover gasket (5).
3. Grasp both sides of lamp holder (7) at grip points (6) and pull lamp holder (7) out from control panel about half an inch.
4. Rotate lamp holder (7) 90° and then pull it the rest of the way out of the control panel.
5. Pull red color filter (8) off bad lamp (9).
6. Push bad lamp (9) out the back of lamp holder (7).
7. Push good lamp into lamp holder (7).
8. Place red color filter (8) over lamp (9).
9. Push lamp holder (7) back into control panel till front of lamp holder extends about half an inch from control panel.
10. Rotate lamp holder (7) 90° and then push it the rest of the way into the control panel.



TA 112651

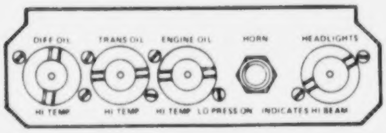
INDICATOR LAMPS REPLACEMENT

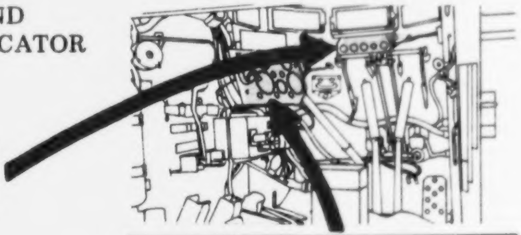
NOTE

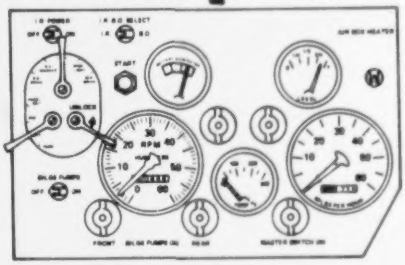
Make sure the lettering on the status indicator is not upside down.

11. Position light cover gasket (5), light cover (4), and light cover retainer (3) onto control panel and secure with two washers (2) and two screws (1).

DRIVER'S CONTROL PANEL AND WARNING LIGHTS PANEL INDICATOR LAMPS


DIFF OIL
TRANS OIL
ENGINE OIL
HORN
HEADLIGHTS
HI TEMP
HI TEMP
HI TEMP
LO PRESS ON
INDICATES HI BEAM




I.R. POWER
OFF
ON
I.R. B.O. SELECT
I.R.
B.O.
AIR BOX HEATER
START
UNLOCK
RPM
BILGE PUMPS
OFF
ON
FRONT
BILGE PUMPS ON
REAR
MASTER SWITCH ON

Replace the indicator lamps as follows:

1. Remove lamp cover.
2. Unscrew bad bulbs.
3. Screw in good bulbs.
4. Test MASTER SWITCH ON lamp and all warning lights by turning on the MASTER SWITCH.
5. Test HEADLIGHTS HI BEAM lamp by turning vehicle light switch to SER. DRIVE and beam selector (dimmer switch) to high beam.
6. Test panel lamps with panel lights switch in PANEL BRT. position.
7. Check BILGE PUMPS ON lamps by turning pumps on. Be sure to turn them off after check is made.

TA 112652

IMAGE TRANSFER ASSEMBLY

INSPECTION AND TEST

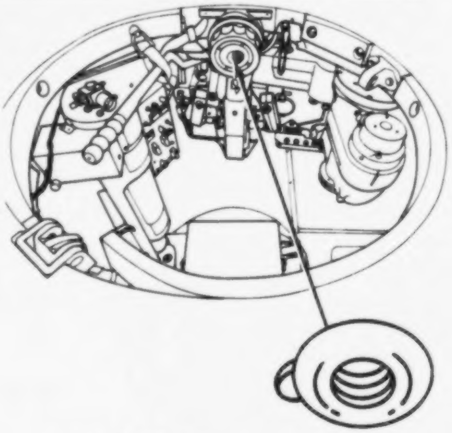
Inspect the ITA for general wear and tear and signs of excessive moisture (see PMCS checks and services).

EYE PROTECTOR REPLACEMENT

Replace eye cup if worn or missing.

CAUTION

Be careful not to scratch the lens.



CLEANING

Clean ITA in accordance with general cleaning instructions, page 3-39 of this manual.

COLD WEATHER MAINTENANCE

Good maintenance is especially critical in cold weather. Be sure to follow these instructions carefully when temperatures fall below the freezing point. Also be sure to read TM 9-207. It has many more good hints on how to keep this equipment and other equipment operating in cold and extremely cold weather.

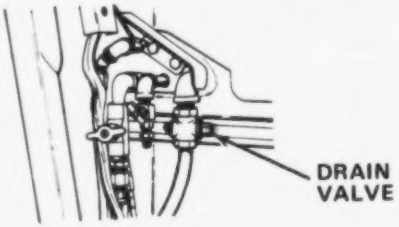
PURGING FUEL SYSTEM

If arctic fuel is required, purge the fuel system before filling up with arctic fuel.

NOTE

Coordinate this operation closely with organizational maintenance. Get help when needed.

1. Drain and refill fuel tank by opening fuel tank drain valve and draining fuel into a container.



NOTE

Fuel tank holds 95 gallons.

TA 071035

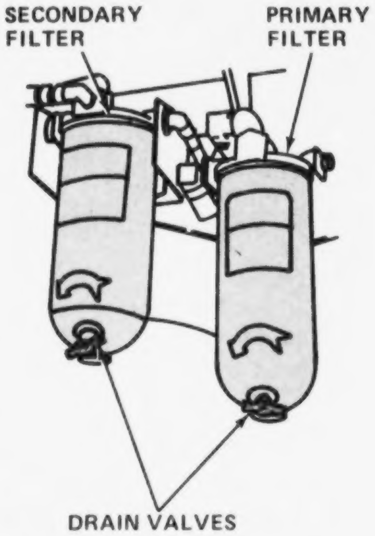
COLD WEATHER MAINTENANCE

2. Purge fuel filters as follows:

   (a) Place a container under both fuel filters.

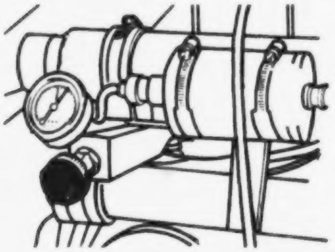
   (b) Loosen filler plugs, and open drain valves. Allow filters to drain till they are empty.

   (c) Fill fuel filters with clean arctic fuel, and put filler plugs back on.



PURGING THE AIR BOX HEATER SYSTEM

Purge air box heater system as follows:



WARNING

Do not purge air box heater system when engine is hot. Fuel could spray on hot engine and burn. Loosen hose slowly to bleed off fuel pressure and keep fuel from spraying on personnel.

1. Make sure MASTER SWITCH is OFF.
2. Slowly loosen hose from gage fitting, and bleed off fuel pressure. Pressure indicator needle should drop to zero.
3. Disconnect hose, and let fuel drain from air box heater system.
4. Put hose back on. Wipe up any spilled fuel.
5. Unlock fuel pump, start engine, and run it at 1,200 to 1,500 rpm until needle goes into yellow zone. Lock fuel pump.

TA 071036

COLD WEATHER MAINTENANCE

NOTE

Accumulator can also be recharged with the hand pump.

6. Pull fuel cutoff control out, and press START switch while operating AIR BOX HEATER switch 5 times. Keep switch on for 2 seconds and off for 2 seconds, to fill system with fuel.

LAUNCHER AND TURRET

Cover launcher when not in use to keep snow and ice from piling up on it. Do not bring launcher components inside unless absolutely necessary. If launcher components must be moved from cold to room temperature, put them in waterproof bags, or other suitable airtight containers with heat conducting walls. Indoors, leave launcher components in containers until they come to room temperature. This will keep condensation from forming. Use vehicle as anti-condensation chamber for fire control equipment by keeping all hatches closed and covers in place whenever tactical situation permits or vehicle is not in use.

MACHINEGUN

1. Keep all moving parts free from moisture.

2. Do not oil parts excessively. Excess oil gets sticky and causes sluggish operation or complete failure.

3. If tactical situation permits, completely disassemble gun, clean and lubricate all parts of the gun, and reassemble, before firing in weather below 0°F.

4. After firing, disassemble gun, and lubricate with LSA and a light coat of LAW if weather is below 0°F. Use PL special at other temperatures.

5. Cover gun if it is kept outside.

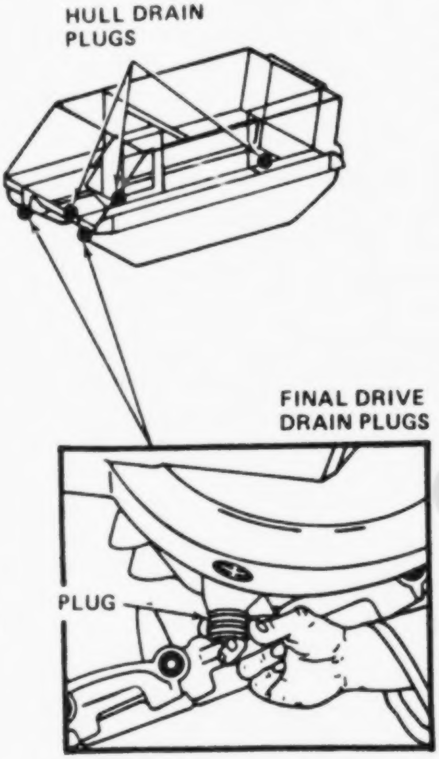
6. When gun and mount are brought indoors, moisture is likely to condense on cold surfaces. Allow gun to reach room temperature, disassemble, wipe off all moisture, lubricate, and put back together.

TA 071037

MAINTENANCE AFTER WATER OPERATIONS
VEHICLE HULL

Even through the vehicle unit housings are sealed, some water may enter, especially if the vehicle has been sunk. Do the following services as soon after performing water operations as possible, especially if vehicle has been in salt water.

Wash the outside of the vehicle in normal way, wash other parts as follows:



1. Take off hull and final drive drain plugs.
2. Point vehicle uphill.
3. Wash entire crew compartment. Flush with clear water, making sure all salt deposits are gone.
4. Take off three floor plates.
5. Wash all parts under floorboard and rinse with clear, clean water.
6. When water is completely drained from crew compartment, turn vehicle around. Point the front uphill and tilt it slightly to the right.
7. Open the front power plant door. Wash and rinse all parts in power plant, and flush right final drive housing.
8. When all the water is gone from the right final drive and from the power plant compartment, tilt the vehicle slightly to the left and keep the front pointed uphill.
9. Repeat flushing of power plant parts, and flush left final drive.
10. When vehicle is completely dry, put all drain plugs back on, and reinstall floor plates.

MAINTENANCE AFTER SWIMMING

ENGINE, TRANSMISSION, FINAL DRIVES, CONTROLLED DIFFERENTIAL, TRANSFER GEARCASE, AND RAMP/SUSPENSION LOCKOUT HYDRAULIC TANK

Check oil in engine, transmission, final drives, controlled differential, transfer gearcase, and ramp/suspension lockout hydraulic tank. If it looks like water has entered these areas, drain and flush them out. Remove and clean engine and differential oil filters and housings. Remove and clean transmission and hydraulic tank filters and cavities. Replace filters, and refill all containers with proper lubricants. Get help from organizational maintenance as needed.

TURRET AND FIRE CONTROL EQUIPMENT

Wash turret and fire control equipment as described in general cleaning instructions.

MACHINEGUN

If the M60 machinegun has been splashed or submerged, water may seep into it and rust it. If the gun has been splashed or submerged, disassemble it completely, clean, lubricate, and reassemble.

TA 071039

MAINTENANCE IN HOT, DRY, HUMID, AND SALTY CLIMATES

COOLING SYSTEM

Clean and flush the cooling system frequently. Fill radiator to bottom of filler neck. Use clean water and add a corrosion inhibitor to prevent rust and corrosion. Don't use water with alkali or other substances in it; they cause rust and scale. When possible, use soft water.

TURRET AND FIRE CONTROL EQUIPMENT

1. In hot, humid areas, inspect parts often for moisture, corrosion, or fungus growth.
2. In hot, dry, dusty, or sandy areas, protect optical parts from etching sand or dust. Remove any accumulated sand or dust from any operating controls.
3. Shield sights from direct rays of sun; heat can damage sights. Keep sights under cover or shade as tactical situation permits. Stow sights when not in use.
4. Wipe launcher parts after handling. This will keep sweat from corroding them.
5. Protect cables and terminals with electrical (ignition) insulating compound.

MACHINEGUN

Inspect the M60 machinegun daily or more often if needed, and maintain it as follows:

1. Make sure that all parts are kept free of moisture, clean, and oiled.
2. After inspection, disassembly, and cleaning, lubricate gun with PL special and LSA.
3. If gun is not in use or it is to be stored in an arms room for a long time, apply a light film of LSA to the inside of gas cylinder and the gas piston immediately after cleaning and inspection. A light film of LSA will not damage the inside of cylinder or the piston and will burn away after the gun has fired a few rounds. Even though LSA has been applied inside the cylinder and on the piston, keep on inspecting this area for signs of corrosion.

TA 071040

MAINTENANCE AFTER OPERATION ON UNUSUAL TERRAIN

MUD

All parts affected must be thoroughly cleaned and lubricated as soon as possible after operation in mud, especially if vehicle has run through liquid mud. Clean all suspension components, and lubricate as specified in the lubrication order (LO 9-2350-259-12).

SAND OR DUST

Vehicle. When operating vehicle in sand or dust, follow these practices:

1. Touch up paint damaged by sandblasting.
2. Force grease into grease fittings to force out lubricants contaminated by sand or dust.
3. Clean air cleaners and fuel and oil filters daily.
4. Clean radiator fins with compressed air daily when operating vehicle in dusty terrain.
5. Cover power plant grilles and other exposed vents with cloth to keep sand and dust out. When halted, cover power plant grilles to keep out dust or sand.
6. Clean nightsight control linkages, azimuth drive components, area around slipring bearing, sight, ITA and squad leader's lenses frequently.

Machinegun. Maintain the M60 machinegun in dusty and sandy areas as follows:

1. Inspect gun daily or more often, and clean as needed.
2. Wipe lubricants from exposed and noncritical operating areas. This keeps sand from sticking to the gun and causing damaging wear.
3. After using gun in sandy areas, immediately clean and lubricate it. Then wipe gun off as in step 2.
4. After handling gun, wipe it off to remove perspiration: sweat can cause metal to rust.
5. Keep gun covered as much as tactical situation permits when operating in dusty or sandy areas.

TA 071041

CHAPTER 4
AMMUNITION

GENERAL

This chapter contains information on ammunition for weapons used on the M901/M901A1 vehicle. Included is information covering classification, identification, care, handling, preservation, transportation authorized rounds, preparation for firing, fuzes, packing, and other pertinent data.

The vehicle uses three types of ammunition: (1) the TOW encased missile for the primary armament; (2) the 7.62mm machinegun ammunition for the M60 machinegun; (3) the L8A1 RP smoke grenade, which is fired from the M243 smoke grenade launcher.

NOTE

If a more detailed coverage of this ammunition and other items of ammunition is needed, see TM 9-1300-206.

TOW MISSILES

DESCRIPTION

The TOW missile is the only ammunition used with the TOW Weapon System. The missile is encased in a launch container which is put into the TOW launcher when ready for use. The encased missile comes in two practice types, each of which contains an inactive warhead. These are the normal-range BTM-71A and the extended-range BTM-71A-1. The encased missile also comes in four attack types, each of which contains a high-explosive warhead. These are the normal-range basic TOW BGM-71A, extended-range basic TOW BGM-71A-1, ITOW BGM-71C, and TOW 2 BGM-71D. See table 4-1 below for missile data.

Table 4-1. TOW Encased Missile Data Chart

Nomenclature	Guided Missile, Surface Attack, BGM-71A, BGM-71A-1,* BGM-71C and BGM-71D		Guided Missile, Practice (Inert Warhead, Live Motors) BTM-71A or BTM-71A-1*	
Length	50.5 in.	(128.27 cm)	50.5 in.	(128.27 cm)
Diameter	8.6 in.	(21.84 cm)	8.6 in.	(21.84 cm)
Volume	1.7 cu. ft.	(48.1 L)	1.7 cu. ft.	(48.1 L)

*Extended Range

TA 159251

Table 4-1. TOW Encased Missile Data Chart — Continued

Nomenclature	Guided Missile, Surface Attack, BGM-71A, BGM-71A-1,* BGM-71C and BGM-71D		Guided Missile, Practice (Inert Warhead, Live Motors) BTM-71A or BTM-71A-1*	
Weight	54.2 lbs	(24.3 kg)	54.2 lbs	(24.3 kg)
	54.2 lbs**	(24.3 kg)**		
	62.0 lbs***	(27.9 kg)***		
Explosive Weight (Approx.)				
Warhead	5.4 lbs	(2.4 kg)	None	
	5.0 lbs**	(2.2 kg)**		
	6.8 lbs***	(3.09 kg)***		
Launch Motor	1.2 lbs	(0.54 kg)	1.2 lbs	(0.54 kg)
Flight Motor	5.7 lbs	(2.58 kg)	5.7 lbs	(2.58 kg)
	7.0 lbs***	(3.18 kg)***		

*Extended Range
**BGM-71C
***BGM-71D

HAZARD CLASSIFICATION

TOW missile is listed in quantity distance class 1.1 and storage compatibility group E for live and C for practice.

EXPLOSIVE CONTENTS

Warhead is CLASS A EXPLOSIVE.

TA 159252

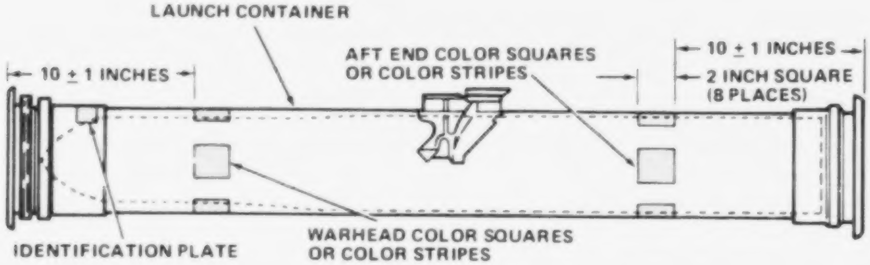
TOW MISSILES

HANDLING AND STORAGE

NOTE

Refer to TM 9-1300-206 for general information about handling and storage. See following precautions about handling and storage of TOW encased missile.

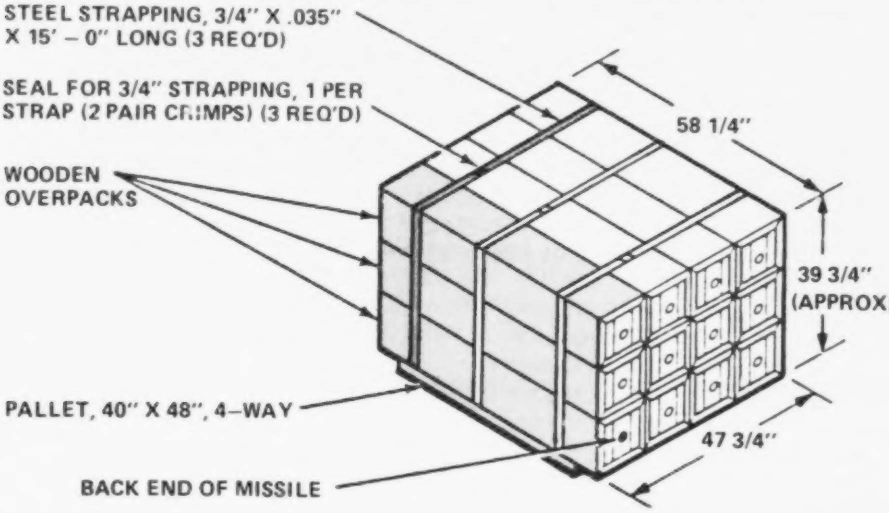
Handling. Handle missiles carefully. Be sure to observe caution below.


LAUNCH CONTAINER
10 ± 1 INCHES
AFT END COLOR SQUARES OR COLOR STRIPES
10 ± 1 INCHES
2 INCH SQUARE (8 PLACES)
IDENTIFICATION PLATE
WARHEAD COLOR SQUARES OR COLOR STRIPES

CAUTION

Do not try to remove missile from launch container.

Do not handle encased missile roughly or drop it. Damage may occur to motor propellant grain or other components and cause a failure at launch or in flight.


STEEL STRAPPING, 3/4" X .035" X 15' – 0" LONG (3 REQ'D)
SEAL FOR 3/4" STRAPPING, 1 PER STRAP (2 PAIR CRIMPS) (3 REQ'D)
WOODEN OVERPACKS
58 1/4"
39 3/4" (APPROX)
PALLET, 40" X 48", 4–WAY
47 3/4"
BACK END OF MISSILE

TA 159253

TOW MISSILES

Storage.

1. Follow good storage practice. Protect encased missiles from sun, rain, and moisture. Use at least six inches of dunnage under the wooden overpacks. Put waterproof cover over and around stack of missiles. Shelter should be big enough to have good air circulation. Shelter and encased missiles should be easy to get at so missiles will stay in good condition and be ready for immediate use.
2. All encased missiles in storage area must be stored with nose ends pointing in the same direction. Direction of storage should permit the least danger to personnel or equipment in case of explosion or fire.
3. Storage area should provide the most protection from damage, corrosion, or wearing away. Storage temperature must be between −65 to 155°F (−53.9 and +68.3°C). The storage area should:
   a. Be on level ground and have the most protection from the weather.
   b. Have good drainage.
   c. Be arranged so that inspection of missiles can be done as required.
   d. Meet quantity-distance requirements. Refer to TM 9-1300-206 for general information on storage of ammunition. Missiles are encased and stored in wooden overpacks. Inspection must be done on encased missiles before they are stored. Storage data is included in table 4-2.

Table 4-2. TOW Encased Missile Color Coding, Shipment, and Storage Data

Nomenclature	Guided Missile, Surface Attack, BGM-71A, BGM-71A-1,* or BGM-71C, BGM-71D	Guided Missile, Practice (Inert Warhead, Live Motors) BTM-71A or BTM-71A-1*
National stock number (NSN)	1410-00-087-1521 1410-01-007-2507* 1410-01-106-8514** 1410-01-135-2092***	1410-00-087-1527 1410-01-007-2508*
Part Number	10189999 11500160* 13060393** 13194473***	10190149 11500162*

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*Extended Range
**BGM-71C
***BGM-71D

TA 159254

Table 4-2. TOW Encased Missile Color Coding, Shipment, and Storage Data — Continued

Nomenclature	Guided Missile, Surface Attack, BGM-71A, BGM-71A-1,* or BGM-71C, BGM-71D	Guided Missile, Practice (Inert Warhead, Live Motors) BTM-71A or BTM-71A-1*
Basic color of encased missile	Olive drab	Olive drab
Color of data markings on encased missile	White	White
Color code marking on encased missile back end	Four 2-inch brown squares 90° apart, or 2-inch brown stripes	Four 2-inch brown squares 90° apart, or 2-inch brown stripes
Color code marking on encased missile warhead end	Four 2-inch yellow squares 90° apart, or 2-inch yellow stripes	Four 2-inch blue squares 90° apart, or 2-inch blue stripes
Basic color of wooden overpack container	Olive drab or unpainted	Olive drab or unpainted
Color code marking on wooden overpack	Six black 4-inch squares, placed diagonally opposite on top, in upper left hand corner on sides, and in upper right hand corner on ends	Six blue 4-inch squares, placed diagonally opposite on top, in upper left hand corner on sides, and in upper right hand corner on ends
Color of data marking on wooden overpack	White or black	White or black
DOT marking on wooden overpack	ROCKET AMMUNITION WITH EXPLOSIVE PROJECTILE	Rocket Motors, Class A Explosive
DOT shipping classification	CLASS A EXPLOSIVE	CLASS A EXPLOSIVE

---

*Extended Range

TA 159255

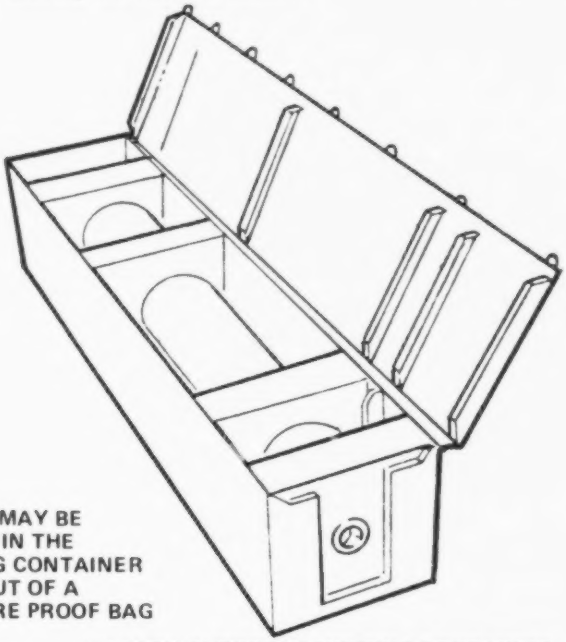
TOW MISSILES

Table 4-2. TOW Encased Missile Color Coding, Shipment, and Storage Data — Continued

Nomenclature	Guided Missile, Surface Attack, BGM-71A, BGM-71A-1,* or BGM-71C, BGM-71D	Guided Missile, Practice (Inert Warhead, Live Motors) BTM-71A or BTM-71A-1*
Quantity-distance classification	1.1	1.1
Storage compatibility group	E	C
Storage temperature limit	−53.9 to +68.3°C (−65 to +155°F)	−53.9 to +68.3°C (−65 to +155°F)

*Extended Range

Overpack Data. TOW encased missile is normally shipped and stored in a wooden overpack to protect it from shocks, being shaken, and being dropped. The overpack contains the encased missile and padding around the missile. The launch container is part of the encased missile and provides protection for it. Take care in handling and moving the encased missile.



NOTE:

MISSILE MAY BE PACKED IN THE SHIPPING CONTAINER IN OR OUT OF A MOISTURE PROOF BAG

WOODEN OVERPACK SHIPPING CONTAINER

TA 159256

TOW MISSILES

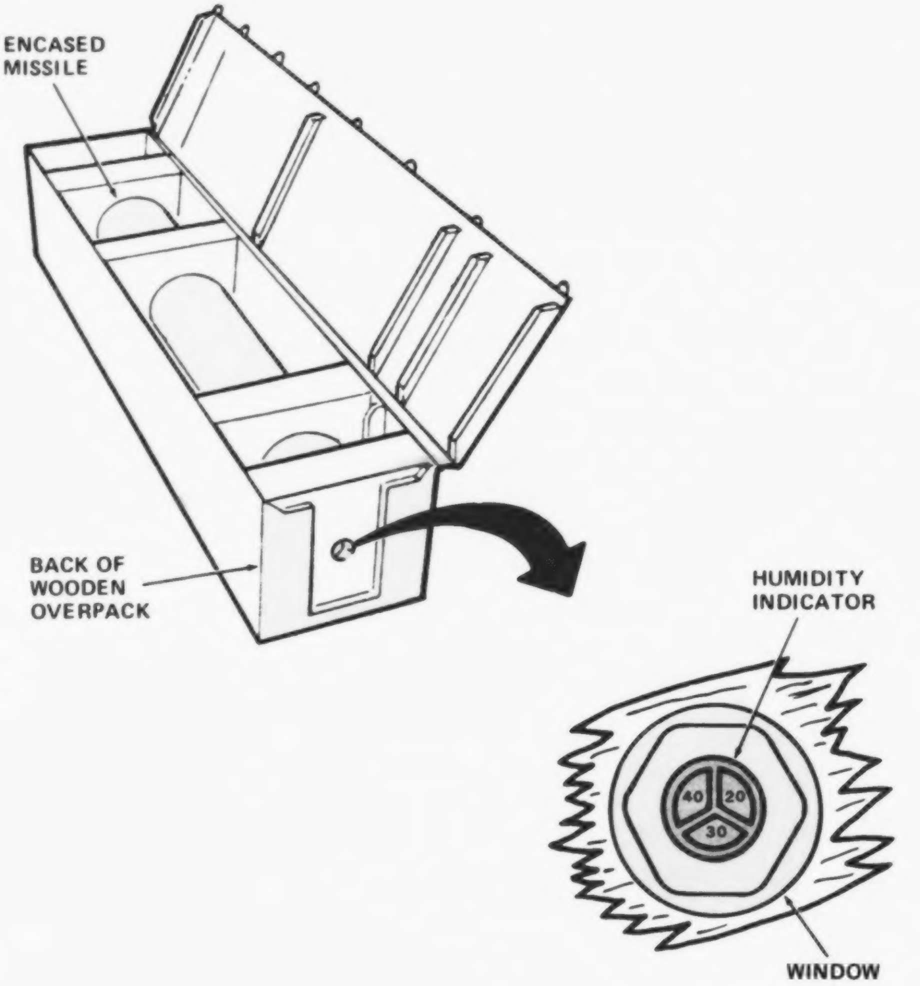
INSPECTION UPON RECEIPT OF TOW MISSILE

Upon receipt of TOW missiles, perform inspection once a year as follows:

Applicable Configuration: BGM-71A, BGM-71A-1, BGM-71C, BGM-71D, BTM-71A, or BTM-71A-1.

NOTE

Inspection of the encased missile is required once a year. Notify supporting organization so inspection can be done.


ENCASED MISSILE
BACK OF WOODEN OVERPACK
HUMIDITY INDICATOR
40
20
30
WINDOW

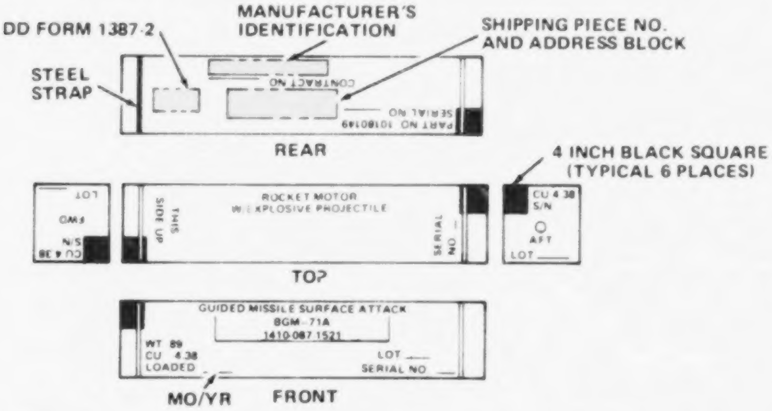
TA 159257

TOW MISSILES

1. Inspect outside of wooden overpack to make sure that it is not damaged in any way.

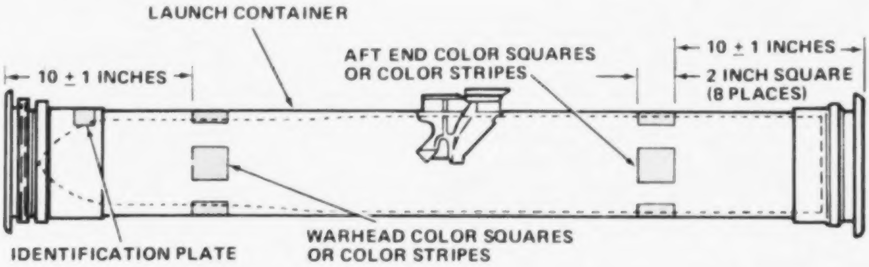
2. Encased missile in the wooden overpack may be in a plastic bag. If it is in a bag, a humidity indicator is located in the bag and can be seen through the window in the back end of the wooden overpack. If the humidity indicator is blue, this step is finished. If the humidity indicator is pink, remove the plastic bag and throw it away, and take the encased missile back to the appropriate ammunition supply point (ASP) as soon as possible.

3. If encased missile is not in a plastic bag, the humidity indicator on the back end of the encased missile will be visible through the window in the rear of the wooden overpack. If the humidity indicator is blue, this inspection is finished. Go to next step. If the humidity indicator is pink take the encased missile back to the appropriate ASP as soon as possible.


DD FORM 1387-2
MANUFACTURER'S IDENTIFICATION
SHIPPING PIECE NO. AND ADDRESS BLOCK
STEEL STRAP
CONTRACT NO
SERIAL NO
PART NO 10180149
REAR
4 INCH BLACK SQUARE (TYPICAL 6 PLACES)
LOT
FWD
S/N
CU 4 38
THIS SIDE UP
ROCKET MOTOR W/EXPLOSIVE PROJECTILE
SERIAL NO
CU 4 38
S/N
AFT
LOT
TOP
GUIDED MISSILE SURFACE ATTACK
BGM-71A
1410-087-1521
WT 89
CU 4.38
LOADED
LOT
SERIAL NO
MO/YR
FRONT

4. Check markings on wooden overpack to be sure that ammunition is identified right. See table 4-2 for identification data.

5. Check shipping papers to make sure that the ammunition received is what is on the shipping papers.

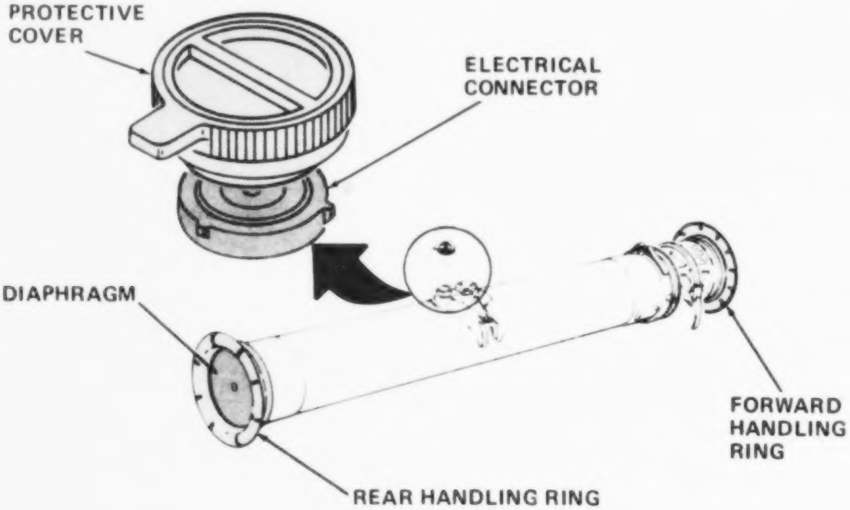

LAUNCH CONTAINER
10 ± 1 INCHES
AFT END COLOR SQUARES OR COLOR STRIPES
10 ± 1 INCHES
2 INCH SQUARE (8 PLACES)
IDENTIFICATION PLATE
WARHEAD COLOR SQUARES OR COLOR STRIPES

6. Check launch container for proper markings, identification, and color coding. See table 4-2.

TA 159258

CAUTION

Do not break diaphragm on end of encased missile. If moisture gets into launch container, missile can be damaged.



ENCASED MISSILE

7. If encased missile is in a plastic bag, open bag and remove missile. Throw bag away.
8. Position protective cover on electrical connector so that grooves on protective cover line up with notches on electrical connector. Turn protective cover clockwise to secure it in place.
9. Turn inside portion of protective cover fully clockwise.
10. Check forward and rear handling rings on encased missile to make sure they are not damaged.

LOADING MISSILE STORAGE RACK

1. Inspect encased missiles in accordance with procedures on page 4-7.

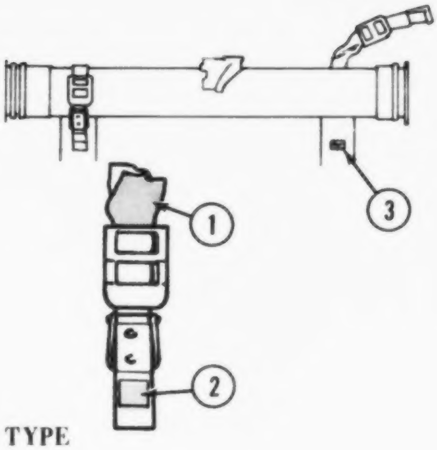
NOTE

Load racks from bottom up.

2. Place the encased missiles on the storage racks with the aft end pointing toward the rear of the vehicle. Make sure the aft end handling ring fits into the recess and the umbilical connector points up.

TA 159259

3. Bring both straps down over the top of the missile.
4. Adjust straps by pulling end (1) so that hook will just reach catch (3).
5. Lengthen strap by opening latch (2). Engage hook. Tighten by closing latch.
6. Secure top racks to bottom rack with hooked fasteners.



7.62MM MACHINEGUN AMMUNITION TYPE

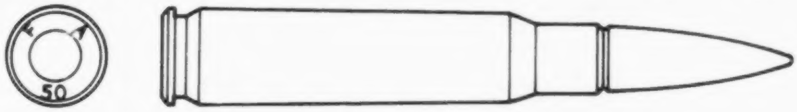
GENERAL

Ammunition is issued as a disintegrating metallic split-linked belt.

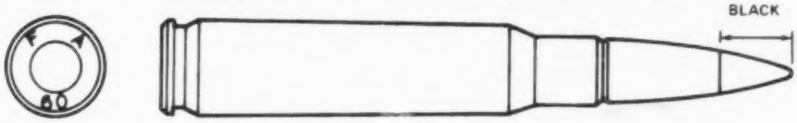
CLASSIFICATION AND MARKING OF AMMUNITION TYPES

Ammunition authorized for the M60 machinegun is classified by type of projectile as follows:

1. Ball cartridge — for use against light-material targets and during training.



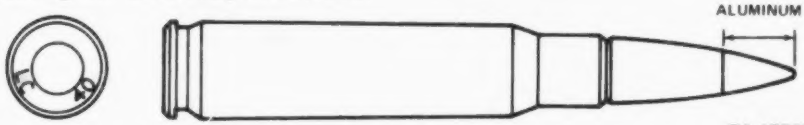
2. Armor-piercing cartridge — for use against lightly armored targets.



NOTE

Armor-piercing incendiary ammunition is not authorized for training.

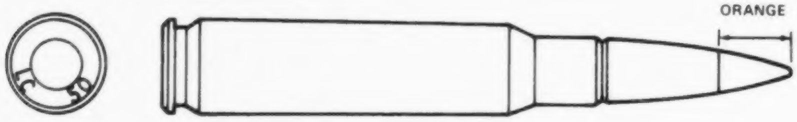
3. Armor-piercing incendiary — for use where the combined effects of armor piercing and incendiary are desired.



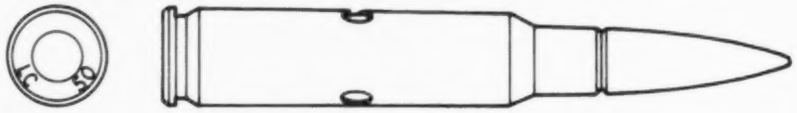
TA 159260

7.62MM MACHINEGUN AMMUNITION TYPE

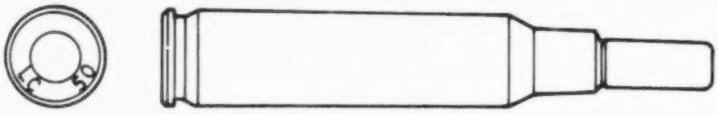
4. Tracer cartridge — for observation of fire, incendiary effects, signaling, and for use during training.



5. Dummy cartridge — for use during training. Contains no explosives.



6. Blank cartridge — for use during training when simulated live fire is desired.

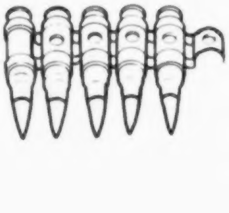


NOTE

The type, caliber, model, and ammunition lot number, including the symbol of the manufacturer, are necessary for complete identification of small arms ammunition. The 7.62mm NATO cartridge is completely identifiable by its appearance, the painting of the projectile tips, the stamping of the manufacturer's initials and year of manufacture on the base of the cartridge case, and the markings on the packing containers.

AMMUNITION PACKAGING

Ammunition is packaged in a metal box containing two bandoliers. Each bandolier contains 100 rounds and weighs approximately 7 pounds. Ammunition in the bandoliers may be hooked together and fired from the container, or the bandoliers may be removed for firing.



TA 159261

7.62MM MACHINEGUN AMMUNITION TYPE

STORAGE

Ammunition should be stored under cover. If it is necessary to leave ammunition in the open, keep it at least 6 inches from the ground and covered with a double thickness of tarpaulin. Place the cover so that it gives maximum protection to the ammunition and allows free circulation of air. Dig suitable trenches to prevent water from flowing under the ammunition.

CARE, HANDLING, AND PRESERVATION

Follow these practices to keep ammunition usable.

1. Do not open ammunition containers until the ammunition is to be used. Ammunition removed from the airtight containers, particularly in damp climates, is likely to corrode.

2. Protect ammunition from mud, dirt, and water. If the ammunition gets wet or dirty, wipe it off prior to use. Wipe off light corrosion as soon as it is discovered. Heavily corroded cartridges, or cartridges which have dented cases or loose projectiles, should not be fired.

3. Do not expose ammunition to the direct rays of the sun. If the powder is hot, excessive pressure may be developed when the gun is fired.

4. Do not oil or grease ammunition. If it is oiled, dust and other abrasives will collect on it and damage the operating parts of the gun.

NOTE

Additional data on 7.62mm ammunition for use in the M60 machinegun is published in TM 9-1005-224-10.

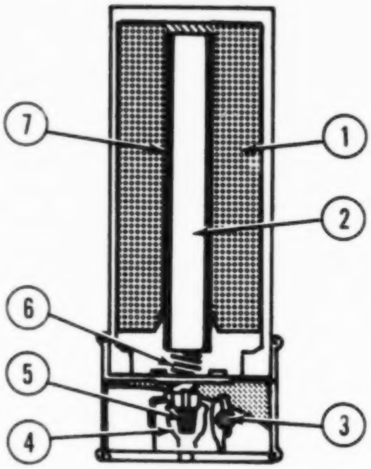
TA 159262

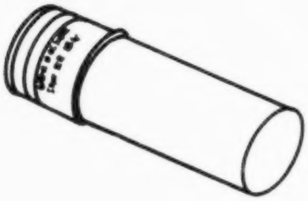
SCREENING SMOKE GRENADES

DESCRIPTION

UK (United Kingdom) L8A1 RP (Red Phosphorous) screening smoke grenades are used with the M243 grenade launcher. They are filled with a red phosphorus and butyl rubber mix (1). Each grenade is 2.61 inches in diameter, 7.28 inches long, and weighs about 1.5 pounds.

A grenade is propelled from the discharger when electrical current at the firing contact (4) ignites the fuze (3). The fuze ignites the propellant charge (5) and a delay composition within the delay holder (6) and, in turn, the gunpowder bursting charge (2). This bursts the rubber case (7) and ignites the red phosphorus/butyl rubber composition (1) to produce an immediate smoke cloud.





IDENTIFICATION

The grenade is completely identified by the markings at the base of the casing.

WARNING

Treat smoke grenades as items of ammunition. Handle them carefully.

TA 159263

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, and technical manuals referenced in this manual.

A-2. FORMS

Accident Identification Card	DD Form 518
Equipment Daily or Monthly Log	DA Form 2408-1
Equipment Inspection and Maintenance Work Sheet	DA Form 2404
Maintenance Request	DA Form 2407
Operator's Permit	SF 46
Quality Deficiency Report	SF 368
Recommended Changes to DA Publications	DA Form 2028-2
Vehicle Accident Report	SF 91

A-3. FIELD MANUALS

Vehicle Recovery Operations	FM 20-22
Chemical, Biological, Radiological, and Nuclear Defense	FM 21-40
Machinegun 7.62MM, M60	FM 23-67
Basic Cold Weather Manual	FM 31-70
Northern Operations	FM 31-71
Mountain Operations	FM 31-72

A-4. TECHNICAL MANUALS

Care, Handling, Preservation, and Destruction of Ammunition	TM 9-1300-206

A-4. TECHNICAL MANUALS – CONTINUED

Rigging	TM 5-725
Operation and Maintenance of Ordnance Materiel in Cold Weather (0° to −65°F)	TM 9-207
Operator's Manual, 7.62MM Machinegun M60	TM 9-1005-224-10
Operator and Organizational Maintenance Manual for TOW Weapon System Guided Missile System M220A1	TM 9-1425-472-12
Operator and Organizational Maintenance Manual for TOW 2 Weapon System, Guided Missile System M220E4	TM 9-1425-450-12
Operator's Manual, Carrier, Personnel Full Tracked, Armored M113A1/M113A2	TM 9-2300-257-10
Operator's, Organizational, Direct Support, and General Support Maintenance Manual: Storage Batteries, Lead and Acid Type	TM 9-6140-200-14
Operator's Manual: Radio Sets, AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (NSN 5820-00-223-7415), AN/VRC-44 (NSN 5820-00-223-7417), AN/VRC-45 (NSN 5820-00-223-7418), AN/VRC-46 (NSN 5820-00-223-7433), AN/VRC-47 (NSN 5820-00-223-7434), AN/VRC-48 (NSN 5820-00-223-7435), and AN/VRC-49 (NSN 5820-00-223-7437) (Used with an Intercom System)	TM 11-5820-401-10-2
Operator's and Organizational Maintenance Manual, Radio Sets AN/VRC-53, AN/VRC-64, AN/GRC-125, and AN/GRC-160 and Amplifier Power-Supply Groups OA-3633/GRC and OA-3633A/GRC	TM 11-5820-498-12
Driver Selection, Training, and Supervision of Full Tracked Vehicles	TM 21-301
Manual for Tracked Combat Vehicle Driver	TM 21-306
Army Maintenance Management System (TAMMS)	TM 38-750

A-5. MISCELLANEOUS PUBLICATIONS

Lubrication Order, Combat Vehicle, Anti-Tank, Improved TOW Vehicle, M901/M901A1	**LO 9-2350-259-12**

TA 159265

APPENDIX B

COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

B-1. SCOPE

This appendix lists integral components of and basic issue items for the M901/M901A1 vehicle to help in inventorying items required for safe and efficient operation.

B-2. GENERAL

This Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the M901/M901A1 vehicle and must accompany the vehicle whenever it is transferred or turned in. The illustrations will help identify these items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the M901/M901A1 vehicle in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the M901/M901A1 vehicle during operation and whenever it is transferred between accountable officers. The illustrations will assist with hard-to-identify items. This manual is the authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3 EXPLANATION OF COLUMNS

a. Illustration. This column is divided as follows:

(1) Page Number. Indicates the page number of the illustration on which the item is shown.

(2) Item Number. The number used to identify item called out in the illustration.

b. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Part Number. Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

TA 159266

B-3. EXPLANATION OF COLUMNS

e. Location. The physical location of each item listed is given in this column.

f. Usable on Code. Not Used.

g. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

h. Quantity. This column is left blank for use during an inventory. Under the Rcvd column, list the quantity actually received on major item. The Date columns are for use when inventorying the major item at a later date; such as for shipment to another site.

TA 071056

Section II. INTEGRAL COMPONENTS OF END ITEM – M901/M901A1

Illustration		National Stock Number	Part No.	Description	Location	Usable On Code	Qty Reqd	Quantity			
Page	Item							Rcvd	Date	Date	Date
B-5	1	2590-00-898-6771	19207-10866115	COVER, periscope	On periscope, M17		5				
	2	2540-00-679-8035	19207-10861607	HOOK, tow	On rear slope		2				
	3	1005-01-050-2105	19207-12266287	MOUNT, machinegun arm assembly	Gunner's station		1				
	4	6650-00-704-3549	19207-7043549	PERISCOPE, M17	In driver's station		5				
	5	1240-01-005-6035	19200-11747126	PERISCOPE, M19A1	On wall left of driver		1				
	6	5315-00-598-5808	19207-7752865	PIN, lock, tow cable	On tow hook		2				
	7	5315-00-862-2683	19207-10890323	PIN, straight, tow cable	On tow hook		2				
B-5	8	6650-00-768-8875	7688875	PERISCOPE, M26	1 in top deck left side 1 in top deck right side		2				

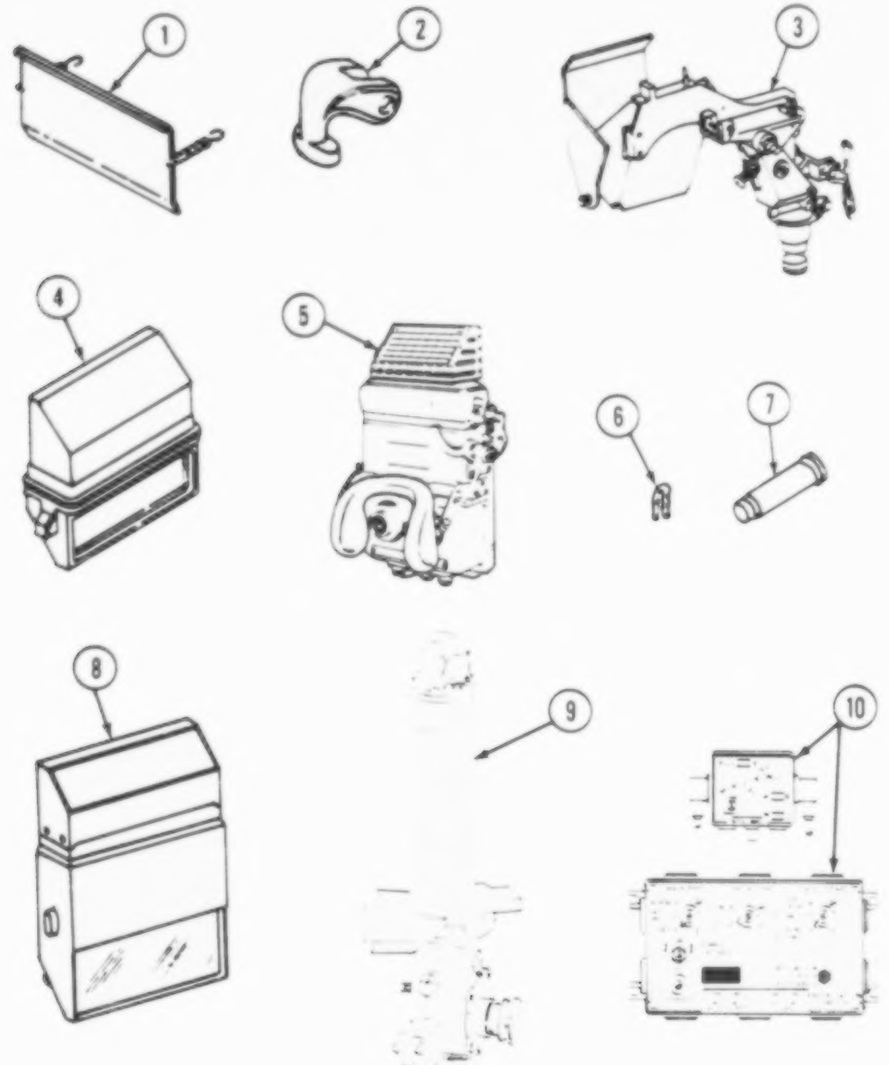
TA 159267

Section II. INTEGRAL COMPONENTS OF END ITEM – M901/M901A1 – Continued

Illustration		National Stock Number	Part No.	Description	Location	Usable On Code	Qty Reqd	Quantity			
Page	Item							Rcvd	Date	Date	Date
B-5	9	1240-01-064-7204	19207-12266851	PERISCOPE, squad leader's	In deck, rear of driver		1				
B-5	10	5830-00-856-3273	12265191	INTERCOMMUNICATIONS SET, AN/VIC-1(V)	On wall, left center		1				

TA 159288

INTEGRAL COMPONENTS OF END ITEM


1
2
3
4
5
6
7
8
9
10

TA 071059

Section III. BASIC ISSUE ITEMS – M901/M901A1

Illustration		National Stock Number	Part No.	Description	Location	Usable On Code	Qty Reqd	Quantity			
Page	Item							Rcvd	Date	Date	Date
B-12	1	5110-00-293-2336	19207-6150925	AXE, single bit	On deck, top rear		1				
	2	2540-00-670-2459	19207-7961712	BAG, pamphlet	On engine rear access door.		1				
	3	5140-00-473-6256	19207-11655979	BAG, tool	On sponson, left front		1				
	4	7510-00-889-3494	19207-11677003	BINDER, loose leaf	In pamphlet bag		1				
	5	4010-00-767-3149	19207-10861718	CABLE, tow	On ramp, outside		1				
	6	7240-00-242-6153	19207-11655980	CAN, water	Outside, right or left rear		1				
	6.1	4930-00-200-1841	96906-MS24203-1	COUPLING, grease gun	In tool bag		1				
B-12	7	2540-00-767-3147	19207-10865823	COVER, grille	On top deck, front		1				

TA 159269

Section III. BASIC ISSUE ITEMS – M901/M901A1 – Continued

Illustration		National Stock Number	Part No.	Description	Location	Usable On Code	Qty Reqd	Quantity			
Page	Item							Rcvd	Date	Date	Date
B12	8	5120-00-240-6040	81348-GGG-B-101	CROWBAR, pinch	On top deck, rear		1				
	9	5110-00-595-8229	19207-11655981	CUTTER, wire, M1938	In tool bag		1				
	10	4930-00-288-1511	19207-6300333	EXTENSION, adapter, G.G.	In tool bag		1				
	11	5120-00-227-8074	96906-MS16243-10	EXTENSION, sq dr, 10" lg	In tool bag		1				
	12	4210-00-270-4512	19207-7714780 or 19207-7359703	EXTINGUISHER, fire, portable, 5 lb	On right wall, rear		1				
B12	13	6545-00-922-1200	11677011	FIRST AID KIT	On sponson left of driver		1				

TA 159270

Section III. BASIC ISSUE ITEMS – M901/M901A1 – Continued

Illustration		National Stock Number	Part No.	Description	Location	Usable On Code	Qty Reqd	Quantity			
Page	Item							Rcvd	Date	Date	Date
B-12	14	5120-01-041-4624	19207-12253183	FIXTURE, track	On top deck, rear		2				
	15	5120-01-041-9920	19207-12253280	GAGE, sprocket track tension, track bushing wear	In tool bag		1				
	16	4930-00-253-2478	19207-10915142	GREASE GUN, hand	In tool bag		1				
	17	5120-00-061-8546	81348-GGG-W-86	HAMMER, hand, ball peen, 2 lb	In tool bag		1				
	18	2590-01-097-6907	19207-12266335	HANDLE, crank erection	In tool bag		1				
	19	5120-00-288-6574	19207-11677021	HANDLE, mattock pick	On deck, top rear		1				
	20	5120-00-236-7590	19207-11655786-1	HANDLE, socket wrench	In tool bag		1				
B-12											

TA 159271

Section III. BASIC ISSUE ITEMS – M901/M901A1 – Continued

Illustration		National Stock Number	Part No.	Description	Location	Usable On Code	Qty Reqd	Quantity			
Page	Item							Rcvd	Date	Date	Date
B-12	21	1240-00-768-8707	19207-7688707	HEAD ASSY, spare IR	On sponson, left		1				
		NO NSN	LO 9-2350-259-12	LUBRICATION ORDER	In pamphlet bag		1				
B-12	22	5120-00-243-2395	19207-11677022	MATTOCK, pick type	On top deck, rear		1				
B-12	23	4930-00-262-8868	19207-6169931	OILER, hand pump type	In engine compartment		1				
B-12	24	5340-00-781-1678		PADLOCK, key operated	On ramp door		1				
B-13	25	5120-00-239-8251	11655790	PLIERS, lineman's	In tool bag		1				
B-13	26	5120-00-494-1911	11655775-3	PLIERS, slipjoint	In tool bag		1				
B-13	27	5120-01-006-8847	19207-11678718	PUNCH, drive pin	In tool bag		1				
B-13	28	5120-00-240-8716	MS15224-4	SCREWDRIVER, cross tip No. 1	In tool bag		1				

TA 159272

Section III. BASIC ISSUE ITEMS – M901/M901A1 – Continued

Illustration		National Stock Number	Part No.	Description	Location	Usable On Code	Qty Reqd	Quantity			
Page	Item							Rcvd	Date	Date	Date
B-13	28	5120-00-234-8913	MS15224-5	**SCREWDRIVER**, cross tip No. 2	In tool bag		1				
	28	5120-00-234-8912	1165577-9	**SCREWDRIVER**, cross tip No. 3	In tool bag		1				
	29	5120-00-278-1283	19207-11655777-11	**SCREWDRIVER**, flat tip	In tool bag		1				
	30	5120-00-293-3336	MS17088-1	**SHOVEL**, hand	On glacis		1				
	31	5120-00-189-7932	19207-11677025-1	**SOCKET**, wrench 1/2 x 9/16	In tool bag		1				
	31	5120-00-189-7946	19207-11677025-2	**SOCKET**, wrench 1/2 x 5/8	In tool bag		1				
	31	5120-00-235-5870	11677025-3	**SOCKET**, wrench 1/2 x 11/16	In tool bag		1				
B-13	31	5120-00-189-7985	19207-11677025-4	**SOCKET**, wrench 1/2 x 3/4	In tool bag		1				

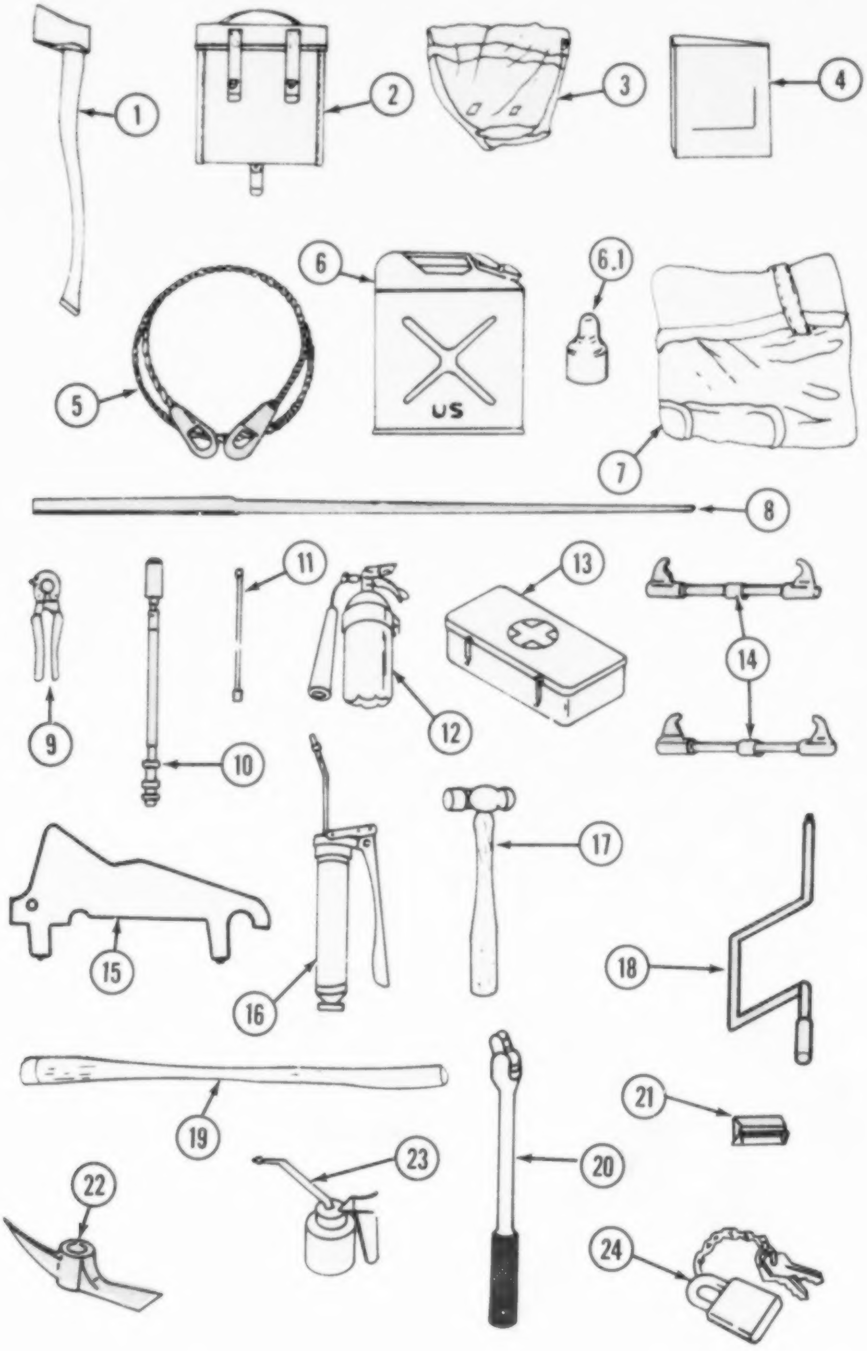
TA 159273

Section III. BASIC ISSUE ITEMS – M901/M901A1 – Continued

Illustration		National Stock Number	Part No.	Description	Location	Usable On Code	Qty Reqd	Quantity			
Page	Item							Rcvd	Date	Date	Date
B-13	31	5120-00-189-7934	19207-11677025-5	SOCKET, wrench 1/2 x 7/8	In tool bag		1				
	31	5120-00-189-7935	19207-11677025-6	SOCKET, wrench 1/2 x 15/16	In tool bag		1				
		NO NSN	TM 9-2350-259-10	TECHNICAL MANUAL	In pamphlet bag		1				
	32	5120-00-264-3796	19207-11655778-5	WRENCH, open end, adjustable 1-5/16 x 12	In tool bag		1				
	33	5120-00-277-2342	19207-5323328	WRENCH, open end, fixed double hd, 15 deg angle 3/8 x 7/16	In tool bag		1				
	33	5120-00-187-7126	MS16380-8	WRENCH, open end, fixed double hd, 15 deg angle 9/16 x 5/8	In tool bag		1				
B-13	33	5120-00-277-8300	19207-11655789-3	WRENCH, open end, fixed double hd, 15 deg angle 11/16 x 13/16	In tool bag		1				

TA 159274

BASIC ISSUE ITEMS – M901/M901A1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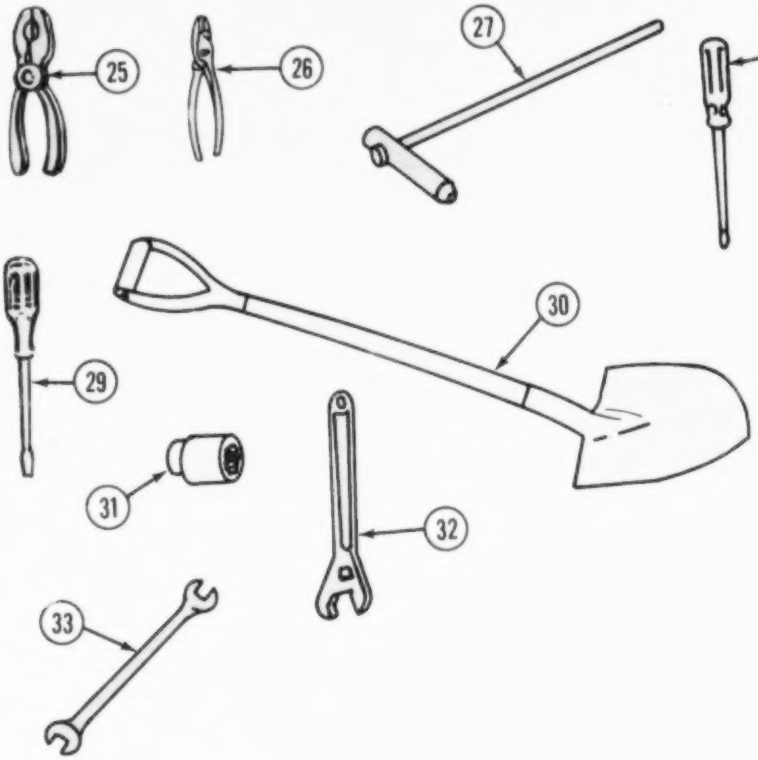
TA 159275

BASIC ISSUE ITEMS – M901/M901A1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TA 159276

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. SCOPE

This appendix lists additional items authorized for the support of the M901/M901A1 vehicle.

C-2 GENERAL

This list identifies items that do not have to accompany the M901/M901A1 vehicle and that do not have to be turned in with it. These items are all authorized by CTA, MTOE, TDA, or JTA.

C-3 EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help identify and request the additional items required to support this equipment.

"Usable On" codes are as follows:

AC — Armored Cavalry

MI — Mechanized Infantry

CI — Armored Cavalry and Mechanized Infantry

TA 159277

Section II. ADDITIONAL AUTHORIZATION LIST

National Stock Number	Description		U/M	Qty Auth
	Part Number & FSCM	Usable On Code		
	AMMUNITION:			
	BOX, ammo, metal (for crtg, 5.56 mm, 1080 rd cap)	CI	box	1
	BOX, ammo, metal (for crtg, 7.62 mm, 200 rd cap)	MI	box	10
		AC	box	3
	CASE, ammo, wood/wire (for ammo box, 7.62 mm, 4 box cap)	AC	case	5
	CARTRIDGE, cal 5.56 mm (for rifle M16A1)	CI	ea	720
	CARTRIDGE, cal 7.62 mm (for machinegun M60)	MI	ea	2000
		AC	ea	4600
	GRENADE, smoke screen, L8A1 (for smoke gren lchr XM243)	CI	ea	16
	GUIDED MISSILE, surface attack (for TOW lchr):	CI	ea	10
1410-00-087-1521	BGM-71A or			
1410-01-007-2507	BGM-71A-1 or			
1410-01-106-8514	BGM-71C or			
1410-01-135-2092	BGM-71D			
	GUIDED MISSILE, practice:			
1410-00-087-1527	BTM-71A or			
1410-01-007-2508	BTM-71A-1			
	BOX, ammo, metal, 5.56 mm, 1080 rd cap (for grenades and mines)	CI	box	2

TA 159278

Section II. ADDITIONAL AUTHORIZATION LIST – Continued

National Stock Number	Description Part Number & FSCM	Usable On Code	U/M	Qty Auth
	BOX, ammo, metal, 7.62 mm, 200 rd cap (for flares and grenades)	CI	box	3
	FLARE, surface, trip	CI	ea	6
	grenade, hand frag	AC	ea	10
	GRENADE, hand incnd	CI	ea	4
	GRENADE, hand, smoke, color	CI	ea	4
	GRENADE, hand, smoke, hc	CI	ea	2
	MINE, ap, M16A1	CI	ea	3
	MINE, ap, M18	MI	ea	2
	ROCKET, he, 66 mm, LAW, M72A2	CI	ea	3
2530-00-846-9345	SIGNAL, illum, ground, M158	CI	ea	4
	ARMAMENT:			
1005-00-605-7710	MACHINEGUN, 7.62 mm, M60	CI	ea	1
	EQUIPMENT, parts & tools for machinegun M60:			
1005-00-608-5001	BARREL, spare, machinegun	CI	ea	1
1005-00-714-9749	SLING	CI	ea	1
1005-00-694-1662	BUFFER, cleaning rod	CI	ea	1
1005-00-791-5420	CASE, carrying, barrel assy and equip	CI	ea	1
4933-00-652-9950	EXTRACTOR, cartridge	CI	ea	1

TA 112656

Section II. ADDITIONAL AUTHORIZATION LIST – Continued

National Stock Number	Description Part Number & FSCM	Usable On Code	U/M	Qty Auth
1005-00-793-6761	HANDLE, cleaning	CI	ea	1
8415-00-266-8843	MITTEN, asbestos	CI	ea	1
1005-00-710-5599	MOUNT, tripod, M122 used on M60 machinegun	CI	ea	1
1005-00-726-6109	ROD, cleaning (5 sections)	CI	ea	1
1005-00-726-6110	HOLDER, swab	CI	ea	1
5120-00-461-1075	WRENCH, screwdriver & reamer	CI	ea	1
1005-00-073-9421	RIFLE, 5.56 mm, M16A1	MI AC	ea ea	2 5
9150-00-889-3522	OIL (LSA)	CI	ea	1
1005-00-556-4174	BRUSH, bore M60 machinegun	CI	ea	1
1005-00-350-4100	BRUSH, receiver M60 machinegun	CI	ea	1
1005-00-690-3115	BRUSH, chamber	CI	ea	1
	TOW HEAVY ANTI-TANK/ ASSAULT WEAPON SYSTEM consisting of the following:			
6140-00-454-8261	BATTERY ASSEMBLY, BB-287	CI	ea	2
1440-00-196-0038	TUBE, GUIDED MISSILE LAUNCHER, M22	C1	ea	1

TA 157969

Section II. ADDITIONAL AUTHORIZATION LIST – Continued

National Stock Number	Description Part Number & FSCM	Usable On Code	U/M	Qty Auth
1430-00-147-2092	MISSILE GUIDANCE SET, AN/TSQ-102 (M901)	CI	ea	1
1430-01-115-3382	MISSILE GUIDANCE SET, AN/TSQ-136 (M901A1)	CI	ea	1
1440-00-140-1529	SIGHT, OPTICAL, GUIDED MISSILE LAUNCHER, MX-9155/TSQ	CI	ea	1
5855-01-037-7339	SIGHT, VISION, NIGHT, AN/TAS-4, INFRARED	CI	ea	1
5855-01-119-9575	SIGHT, VISION, NIGHT AN/TAS-4A, INFRARED (M901A1)	CI	ea	1
1440-00-455-5905	TRAVERSING UNIT, GUIDED MISSILE LAUNCHER M53 (M901)	CI	ea	1
1430-01-115-3405	TRAVERSING UNIT, GUIDED MISSILE LAUNCHER (M83) (M901A1)	CI	ea	1
1440-00-456-1731	MOUNT, TRIPOD, GUIDED MISSILE LAUNCHER, M159E1	CI	ea	1
	EQUIPMENT for TOW HEAVY ANTI-TANK/ASSAULT WEAPON SYSTEM			
1430-01-049-5342	BATTERIES, nightsight (5 each in case) (M901)	CI	case	1
TBD	NIGHTSIGHT BATTERY POWER CONDITIONER (M901A1) (SM-D-969145)	CI	ea	1
6135-01-036-3495	BATTERIES, nightsight battery power conditioner (M901A1) (BA-5590/U)	CI	ea	4

TA 159279

Section II. ADDITIONAL AUTHORIZATION LIST – Continued

National Stock Number	Description Part Number & FSCM	Usable On Code	U/M	Qty Auth
5855-01-029-8730	COLLIMATOR, boresight, nightsight (in case)	CI	ea	1
1430-01-047-2136	COOLANT CARTRIDGES, nightsight (5 each in case) (M901)	CI	case	3
1450-01-086-7157	TOW VEHICLE POWER CONDITIONER	CI	ea	1
	COMMUNICATIONS EQUIPMENT:			
5820-00-223-7473	RADIO SET, AN/GRC-160	MI	ea	1
5820-00-223-7475	RADIO SET, AN/VRC-64	AC	ea	1
5820-01-054-7176	INSTALLATION HARNESS, radio set AN/GRC-160	MI	ea	2

TA 159280

Section II. ADDITIONAL AUTHORIZATION LIST – Continued

National Stock Number	Description Part Number & FSCM	Usable On Code	U/M	Qty Auth
5820-00-087-6096	INSTALLATION HARNESS, radio set AN/VRC-64	AC	ea	2
3895-00-498-8343	CABLE, telephone, WD-1/DR-8 (with reeling machine RL-39)	CI	ea	1
	HELMET, CVC, DH-132	MI AC	ea ea	4 5
8415-00-094-2691	Small or			
8415-00-094-2679	Medium or			
8415-00-094-2684	Large			
5805-00-521-1320	TELEPHONE SET, TA-1/PT	AC	ea	1
5805-00-543-0012	TELEPHONE SET, TA-312/PT	MI	ea	1
	MISCELLANEOUS EQUIPMENT:			
1240-00-530-0974	BINOCULAR, 7 x 50 mm, M17A1 (in case)	CI	ea	1
4230-00-720-1618	DECONTAMINATION APPARATUS, portable, DS2	CI	ea	1
	DUFFLE BAG (with personnel equipment)	MI	ea	1
5855-00-150-1820	GOGGLES, night vision, AN/PVS-5 (in case)	CI	ea	1
5120-00-265-7462	HAMMER, hand sledge, 6 lb	CI	ea	1

TA 157971

Section II. ADDITIONAL AUTHORIZATION LIST – Continued

National Stock Number	Description		U/M	Qty Auth
	Part Number & FSCM	Usable On Code		
8345-00-174-6865	PANEL MARKER, aerial liaison, 6 ft x 2 ft (without case)	CI	ea	1
	RATIONS, field, combat	AC	case	2
5855-00-629-5334	SIGHT, night vision, indv wpn, AN/PVS-4	AC	ea	1
7310-00-285-6155	STOVE, cooking, gasoline, M1950 (with case)	CI	ea	1
2540-00-587-2532	TARPAULIN, cloth cotton, 12 ft x 17 ft	CI	ea	1

TA 112660

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. SCOPE

This appendix lists expendable supplies and materials needed to operate and maintain the M901/M901A1 vehicle. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. EXPLANATION OF COLUMNS

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item. C - Operator/Crew.

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

TA 159281

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST – M901/M901A1

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	C	6810-00-201-0906	Alcohol, Denatured (81348) O-E-760, Grade III	pt
2	C	6850-00-127-7193	Antifogging Kit, M1 (81361) B5-16-1	ea
3	C	6135-00-120-1020	Battery, Dry, Magnesium, BA-30, 1.5 volt, 8 ea (96906) MS75059	ea
3.1	C	7920-00-205-1427	Brush, Dusting, Lens and Photographic Negatives (81348) H-B-1654	ea
4	C	6850-00-227-1887	Cleaning Compound, Optical Lens (Ready to Use) (81349) MIL-C-43454	qt
5	C	6850-00-224-6657	Cleaning Compound, Solvent (For Bore of Small Arms and Automatic Aircraft Weapons (81349) MIL-C-372	oz
6	C	8305-00-267-3015	Cloth, Cheesecloth, Cotton, Bleached and Unbleached (81348) CCC-C-440, Type II, Class 2	lb
7	C	8320-00-299-8625	Cotton, Purified (Sterile) and Nonsterile (81348) JJJ-C-561	lb
8	C	6850-00-281-1985	Dry Cleaning Solvent (81348) P-D-680	gl
9	C	6230-00-264-8261	Flashlight, Electric: Hand, 2-cell, 1 ea (80058) MX991U	ea

TA 159282

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST – M901/M901A1 – Continued

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
10	C	6240-00-019-3093	Lamp, Incandescent, G-6 Bulb, Single Contact, Bayonet Candelabra Base (96906) MS15570-623	ea
11	C	6240-00-763-7744	Lamp, Incandescent, Single Contact Midget Flanged Base (T-1-3/4 Bulb) (96906) MS25237-387	ea
12	C	6240-00-295-2668	Lamp, Incandescent, S-8 Bulb, Single Contact, Bayonet Candelabra Base (96906) MS35478-1691	ea
13	C	6240-00-266-9940	Lamps, Incandescent, Center Contact, Miniature Bayonet Base (T-3-1/4 Bulb) (96906) MS25231-1829	ea
14	C	9150-00-889-3522	Lubricant, Semi-fluid (Automatic Weapons) (81349) MIL-L-46000	oz
15	C	9151-00-231-6689	Lubricating Oil, General Purpose, Preservative (Water Displacing, Low Temperature) (81348) VV-L-800	qt
16	C	9150-00-292-9689	Lubricating Oil, Weapons, Low Temperature (81349) MIL-L-14107	qt
17	C	6640-00-285-4694	Paper, Lens (81348) NNN-P-40	sh

TA 159283

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Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST – M901/M901A1 – Continued

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
18	C	7920-00-205-1711	Rag, Wiping, Cotton and Cotton Synthetic (81348) DDD-R-30, Grade B	lb
19	C	7930-00-880-4454	Solution, Lens Cleaning	gl
20	C	1005-00-288-3565	Swab, Small Arms Cleaning (19204) 5019316	ea
21	C	6810-00-664-0387	Trichloroethane, Technical Inhibited (Methyl Chloroform) (81348) O-T-620	gl
22	C	7920-00-514-2417	Brush, Acid Swab (81348) HB00643, Type II, Class 1	ea

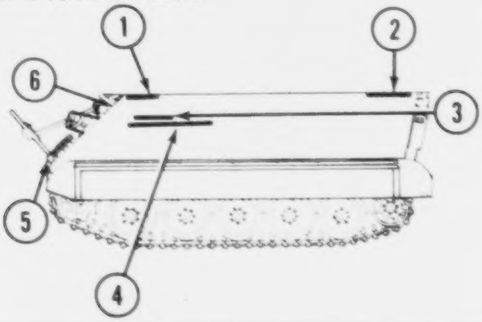
TA 159284

APPENDIX E
SIGN GUIDE

GENERAL

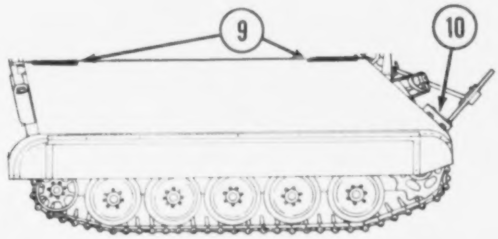
This appendix provides the locations of, types of, and information about the decals and signs on the M901/M901A1 vehicle. Many of these decals and signs mark places where equipment should be stowed. (A separate stowage guide is also provided in Appendix F.) Some are cautions, warnings, or instructions needed to operate the M901/M901A1 vehicle. Locations are numbered for cross-reference purposes.

EXTERNAL SIGNS AND DECALS

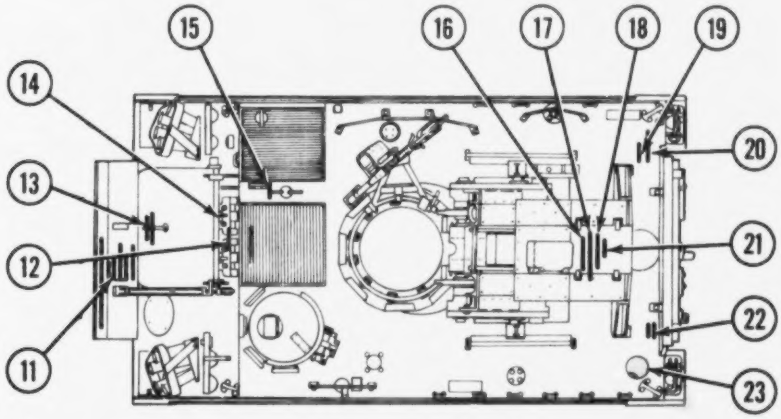


Item No.	Information	Type	Remarks
1.	LIFT HERE	Stencil, black letters	On all 4 corners of vehicle
2.	LIFT HERE	Stencil, black letters	On all 4 corners of vehicle
3.	(Radio type)	Stencil, black letters	AN/VRC-64 or AN/GRC-160
4.	REMOVE SCREENS, INSTALL ACCESS PLATES AND GASKETS, AND DRAIN PLUGS BEFORE VEHICLE OPERATION	Stencil, black letters	Left front
5.	SMOKE GRENADES	Stencil, black letters	On each grenade box
6.	(U.S. Army registration number)	Stamped	Example: U.S. ARMY 102051
7.	Deleted		

TA 159285



Item No.	Information	Type	Remarks
8.	Deleted		
9.	LIFT HERE	Stencil, black letters	4 locations: left and right of front and rear
10.	SMOKE GRENADES	Stencil, black letters	On storage box
11.	CHECK FOR WATER OPERATION DRAIN PLUGS BILGE PUMPS LOAD DISTRIBUTION HATCHES TRACK SHROUDS	Stencil, black letters	On back of trim vane, 6 lines

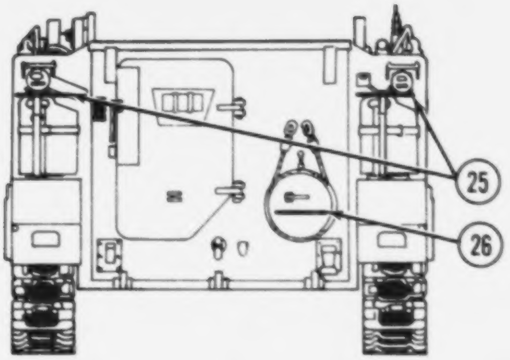


TA 158977

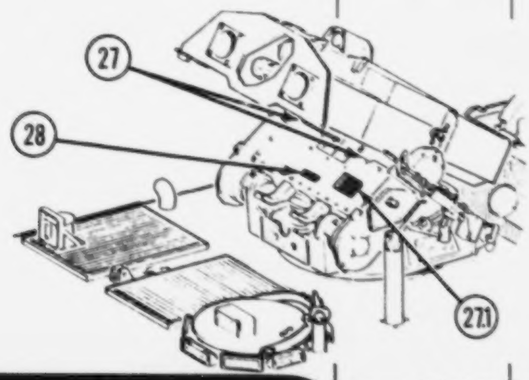
EXTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
12.	SHOVEL	Stencil, black letters	On top deck, front
13.	ACCESS DOOR RELEASE	Stencil, black letters	2 lines
14.	TRACK SHOES	Stencil, black letters	On front of vehicle
15.	WATER	Stencil, black letters	Near radiator cover
16.	CROWBAR	Stencil, black letters	On top deck
17.	HANDLE MATTOCK	Stencil, black letters	On top deck
18.	SLEDGE	Stencil, black letters	On top deck
19.	PICK MATTOCK	Stencil, black letters	On top deck
20.	TRIPOD	Stencil, black letters	On top deck
21.	AXE	Stencil, black letters	On top deck
22.	TRACK FIXTURE	Stencil, black letters	On top deck
23.	DIESEL FUEL	Stencil, black letters	Under fuel cover plate

TA 071079



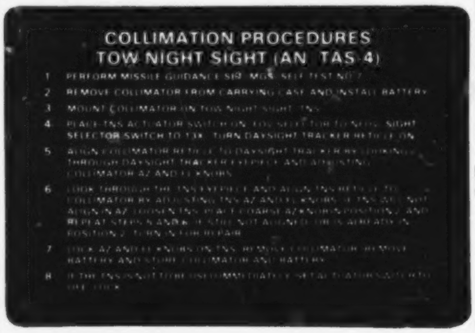
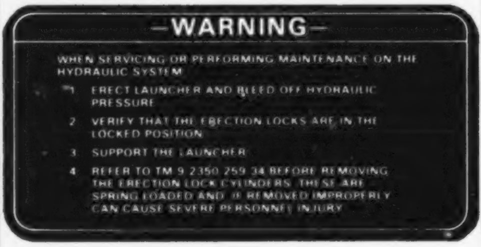
Item No.	Information	Type	Remarks
24.	Deleted		
25.	WATER CAN	Stencil, black letters	1 on each side
26.	TOW CABLE	Stencil, black letters	On ramp



Item No.	Information	Type	Remarks
27.	DANGER BEFORE REMOVING ERECTION LOCKS REFER TO TM 9-2350-259-34. THE LOCKS ARE SPRING LOADED AND CAN CAUSE INJURY TO PERSONNEL.	Decal (plate) red background, white letters	2 locations on erection unit

TA 158978

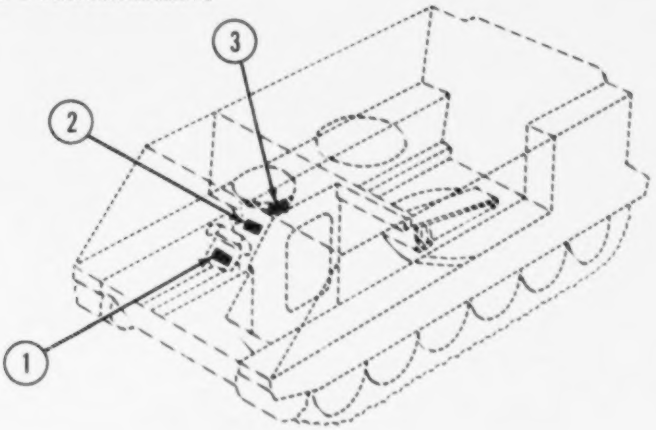
EXTERNAL SIGNS AND DECALS

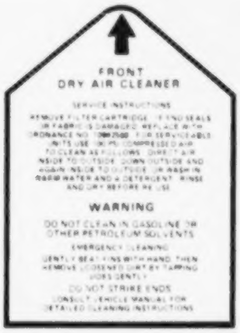
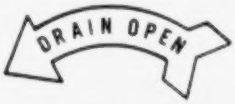
Item No.	Information	Type	Remarks
27.1	 COLLIMATION PROCEDURES TOW NIGHT SIGHT (AN TAS-4) 1 PERFORM MISSILE GUIDANCE SET (MGS) SELF TEST NO 7 2 REMOVE COLLIMATOR FROM CARRYING CASE AND INSTALL BATTERY 3 MOUNT COLLIMATOR ON TOW NIGHT SIGHT (TNS) 4 PLACE TNS ACTUATOR SWITCH ON, FOV SELECTOR TO NFOV, SIGHT SELECTOR SWITCH TO 13X. TURN DAYSIGHT TRACKER RETICLE ON 5 ALIGN COLLIMATOR RETICLE TO DAYSIGHT TRACKER BY LOOKING THROUGH DAYSIGHT TRACKER EYEPIECE AND ADJUSTING COLLIMATOR AZ AND EL KNOBS 6 LOOK THROUGH THE TNS EYEPIECE AND ALIGN TNS RETICLE TO COLLIMATOR BY ADJUSTING TNS AZ AND EL KNOBS. IF TNS WILL NOT ALIGN IN AZ, LOOSEN TNS, PLACE COARSE AZ KNOB IN POSITION 2, AND REPEAT STEPS 5 AND 6. IF STILL NOT ALIGNED, OR IS ALREADY IN POSITION 2, TURN IN FOR REPAIR 7 LOCK AZ AND EL KNOBS ON TNS. REMOVE COLLIMATOR. REMOVE BATTERY AND STORE COLLIMATOR AND BATTERY 8 IF THE TNS IS NOT TO BE USED IMMEDIATELY, SET ACTUATOR SWITCH TO OFF LOCK	Decal (sticker) black back-ground, silver letters	On erection arm
28.	 —WARNING— WHEN SERVICING OR PERFORMING MAINTENANCE ON THE HYDRAULIC SYSTEM 1 ERECT LAUNCHER AND BLEED OFF HYDRAULIC PRESSURE 2 VERIFY THAT THE ERECTION LOCKS ARE IN THE LOCKED POSITION 3 SUPPORT THE LAUNCHER 4 REFER TO TM 9 2350 259 34 BEFORE REMOVING THE ERECTION LOCK CYLINDERS. THESE ARE SPRING LOADED AND, IF REMOVED IMPROPERLY, CAN CAUSE SEVERE PERSONNEL INJURY	Decal (plate) red back-ground, white letters	On erection arm

TA 158979

INTERNAL SIGNS AND DECALS

ENGINE COMPARTMENT

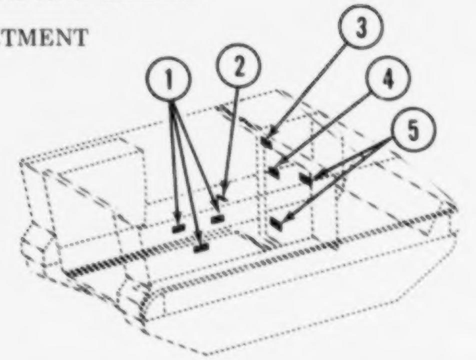


Item No.	Information	Type	Remarks
1.	 FRONT DRY AIR CLEANER SERVICE INSTRUCTIONS REMOVE FILTER CARTRIDGE. IF END SEALS OR FABRIC IS DAMAGED, REPLACE WITH ORDNANCE NO. [illegible]. FOR SERVICEABLE UNITS USE 100 PSI COMPRESSED AIR TO CLEAN AS FOLLOWS: DIRECT AIR INSIDE TO OUTSIDE, DOWN OUTSIDE AND AGAIN INSIDE TO OUTSIDE, OR WASH IN WARM WATER AND A DETERGENT. RINSE AND DRY BEFORE RE-USE. WARNING DO NOT CLEAN IN GASOLINE OR OTHER PETROLEUM SOLVENTS EMERGENCY CLEANING GENTLY BEAT FINS WITH HAND, THEN REMOVE LOOSENED DIRT BY TAPPING SIDES GENTLY. DO NOT STRIKE ENDS CONSULT VEHICLE MANUAL FOR DETAILED CLEANING INSTRUCTIONS	Decal (sticker) white back-ground, black letters	Fastened to air cleaner housing
2.		Decal (sticker) white back gound, black letters	1 on each fuel filter
3.	FAN OIL GAGE AND FILLER	Decal (sticker) white back-ground, black letters	On fan housing

TA 071082

INTERNAL SIGNS AND DECALS

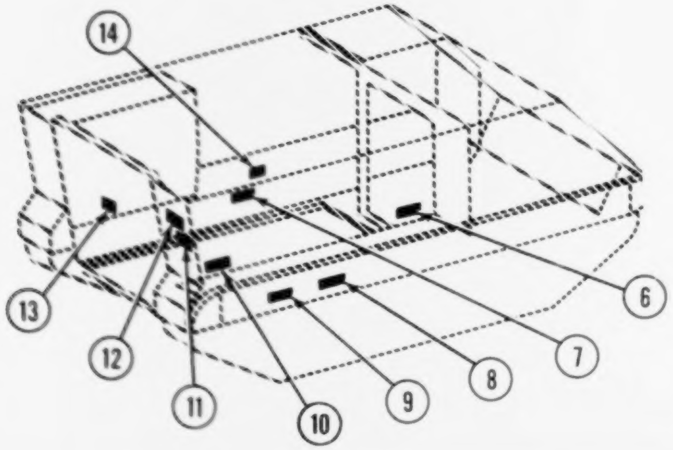
CREW COMPARTMENT



Item No.	Information	Type	Remarks
1.	(M901) NIGHT SIGHT COOLANT	Decal (sticker) white back-ground, black letters	3 places on on right wall
2.	M158 GROUND SIGNAL	Decal (sticker) white back-ground, black letters	On left sponson
3.	AIR VENT OPEN ↕ CLOSED	Decal (sticker) white back-ground, black letters	Above vent control handle (on vehicles with M901/M113A1 and M901A1/M113A1 chassis only)
4.	PAMPHLET BAG	Decal (sticker) white back-ground, black letters	On rear engine access panel
5.	DANGER MONOXIDE GAS SECURE THIS PANEL BEFORE STARTING ENGINE	Decal (sticker) white back-ground, red letters	1 on each access panel

TA 159286

INTERNAL SIGNS AND DECALS



Item No.	Information	Type	Remarks
6.	NIGHT GOGGLES OR 7.62 AMMO	Decal (sticker) white background, black letters	On right wall
7.	NIGHT SIGHT COLLIMATOR	Decal (sticker) white background, black letters	On right wall
8.	LAUNCH TUBE	Decal (sticker) white background, black letters	On right sponson
9.	TRIPOD	Decal (sticker) white background, black letters	On right sponson

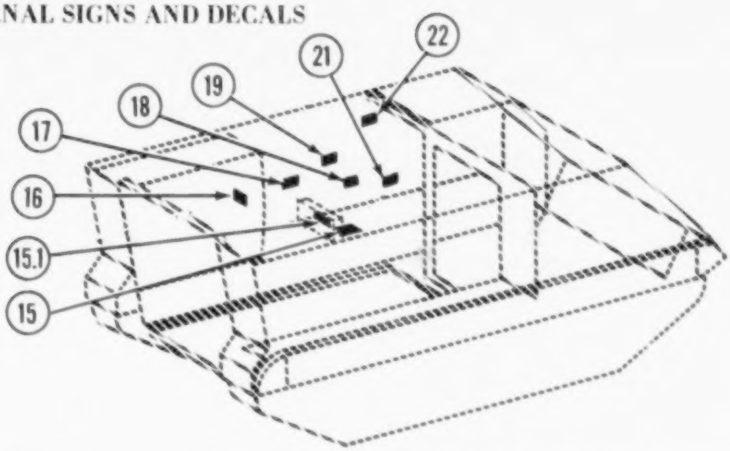
TA 157977

INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
10.	SERVICE BATTERY WEEKLY MAINTAIN ELECTROLYTE LEVEL PER INSTRUCTIONS ON BATTERY SPECIFIC GRAVITY READING TO BE 1.250 OR HIGHER AT 80°F IF UNDER 1.250 RECHARGE OR REPLACE BATTERY KEEP TOP OF BATTERY & TERMINALS CLEAN FILLER PLUGS MUST BE TIGHT & VENT HOLES OPEN	Decal (plate) black background, white letters	On battery cover
11.	(M901) NIGHT SIGHT BATTERIES	Decal (sticker) white background, black letters	Crew compartment, right rear
12.	FIRE EXTINGUISHER	Decal (sticker) white background, black letters	Crew compartment, right rear
13.	WARNING KEEP HANDLE UP WHEN DOOR IS OPEN	Stencil, black letters	Above door handle
14.	CAUTION BATTLE OVERRIDE SWITCH TO BE USED ONLY IF CIRCUIT BREAKER WILL NOT STAY IN "ON" POSITION.	Decal (plate) black background, white or aluminum letters	On top of suppressor assembly

TA 159287

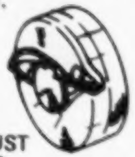
INTERNAL SIGNS AND DECALS



Item No.	Information	Type	Remarks
15.	A.P. MINE M16	Decal (sticker) white background, black letters	On left sponson
15.1	MGS BATTERY	Decal (sticker) white background, black letters	On front of spare MGS battery box
16.	M60 EQUIP., PARTS & TOOLS	Decal (sticker) white background, black letters	On front of fuel tank
17.	NIGHT GOGGLES & RATION OR TRAVERSING UNIT	Decal (sticker) white background, black letters	On left wall
18.	TELE. CABLE	Decal (sticker) white background, black letters	On left wall

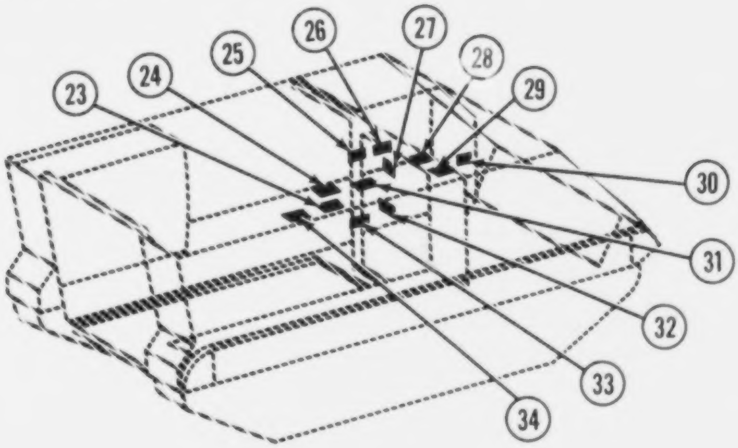
TA 157978

INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
19.	**NIGHT SIGHT OR 7.62 AMMO**	Decal (sticker) white background, black letters	On left wall
20.	Deleted		
21.	**FLASHLIGHT**	Decal (sticker) white background, black letters	On left wall just behind driver
22.	**CAUTION** FIRE EXTINGUISHER SAFETY WIRE MUST BE INSTALLED AS SHOWN.  WIRE MUST BREAK IF SHAFT IS TURNED 45°.	Decal (sticker) white background, red letters	Above fire extinguisher, left wall

TA 157979

INTERNAL SIGNS AND DECALS



Item No.	Information	Type	Remarks
23.	FIRST AID KIT	Decal (sticker) white background, black letters	On left sponson
24.	TELEPHONE	Decal (sticker) Black on white background	On left sponson
25.	IR PERISCOPE	Decal (sticker) white background, black letters	On left wall just to the left of driver
26.	CAUTION DO NOT TURN OFF MASTER SWITCH UNTIL HEATER HAS BEEN TURNED OFF AND HAS PURGED ITSELF.	Decal (sticker) white background, black letters	On master switch panel
27.	RIFLE	Decal (sticker) white background, black letters	On machine-gun bracket

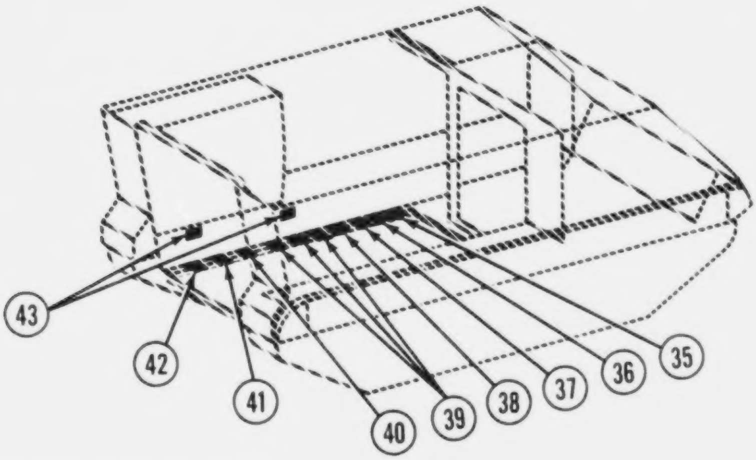
TA 112665

INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
28.	STOVE	Decal (sticker) white background, black letters	Left sponson
29.	TOOLS	Decal (sticker) white background, black letters	Left sponson
30.	DANGER HIGH VOLTAGE POWER PACK ORDNANCE NO. 7355743 SPARTON NO. SE98002-1 SERIAL NUMBER ☐ SPARTON ELECTRONICS DIVISION OF SPARTON CORPORATION JACKSON, MICHIGAN, USA	Decal (plate) red background, white letters	Attached to IR power supply
31.	7.62 AMMUNITION	Decal (sticker) white background, black letters	On sponson
32.	PERISCOPE	Decal (sticker) white background, black letters	On bracket
33.	RATIONS	Decal (sticker) white background, black letters	On side of sponson
34.	BINOCULARS	Decal (sticker) white background, black letters	On left sponson

TA 071089

INTERNAL SIGNS AND DECALS



Item No.	Information	Type	Remarks
35.	A.P. MINE M16	Decal (sticker) white background, black letters	On underside of troop seat
36.	A.P. MINE M18 OR GRENADE, FRAG.	Decal (sticker) white background, black letters	On underside of troop seat
37.	TRIP FLARE OR A.P. MINE M18	Decal (sticker) white background, black letters	On underside of troop seat
38.	7.62 AMMO OR TRIP FLARE	Decal (sticker) white background, black letters	On underside of troop seat

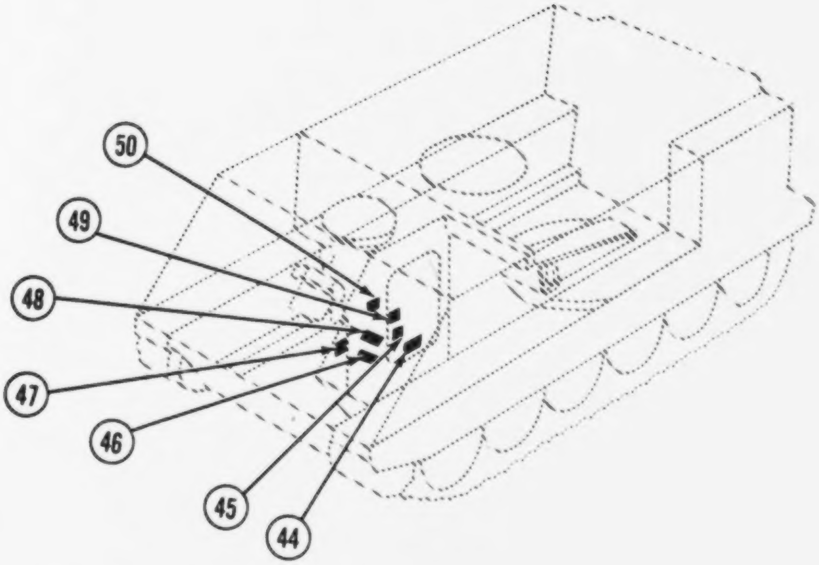
TA 157980

INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
39.	**7.62 AMMO**	Decal (sticker) white background, black letters	On underside of troop seat
40.	**GRENADE, INCEND.**	Decal (sticker) white background, black letters	On underside of troop seat
41.	**GRENADE, COLOR & H.C. SMOKE**	Decal (sticker) white background, black letters	On underside of troop seat
42.	**5.56 AMMO**	Decal (sticker) white background, black letters	On underside of troop seat
43.	**LAW MISSILE**	Decal (sticker) white background, black letters	On floor below seat

TA 157981

INTERNAL SIGNS AND DECALS


50
49
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47
46
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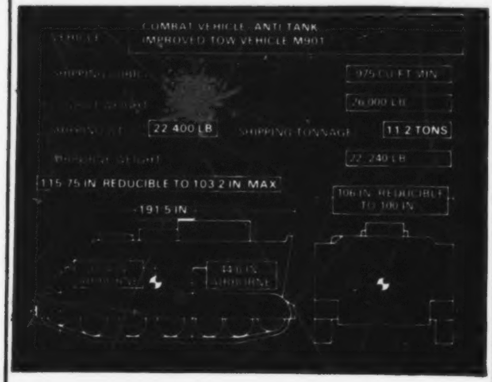
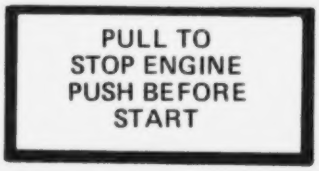
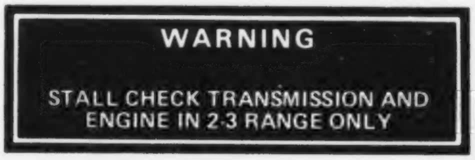
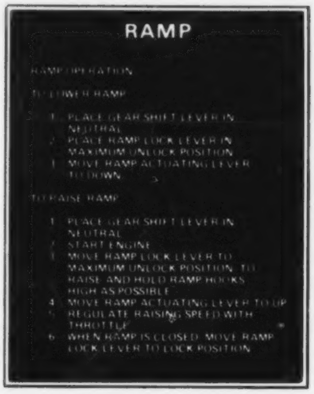
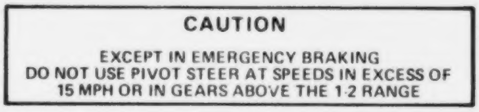
44

Item No.	Information	Type	Remarks
44.	DANGER MONOXIDE GAS SECURE THIS PANEL BEFORE STARTING ENGINE	Decal (sticker) white background, red letters	On driver's engine access panel
45.	 COMBAT VEHICLE ANTI TANK IMPROVED TOW VEHICLE M901 975 CU FT MIN 26,000 LB 22 400 LB SHIPPING TONNAGE 11 2 TONS 22 240 LB 115 75 IN REDUCIBLE TO 103 2 IN MAX 106 IN REDUCIBLE TO 100 IN 191 5 IN	Decal (plate) black background, white letters	On driver's engine access panel

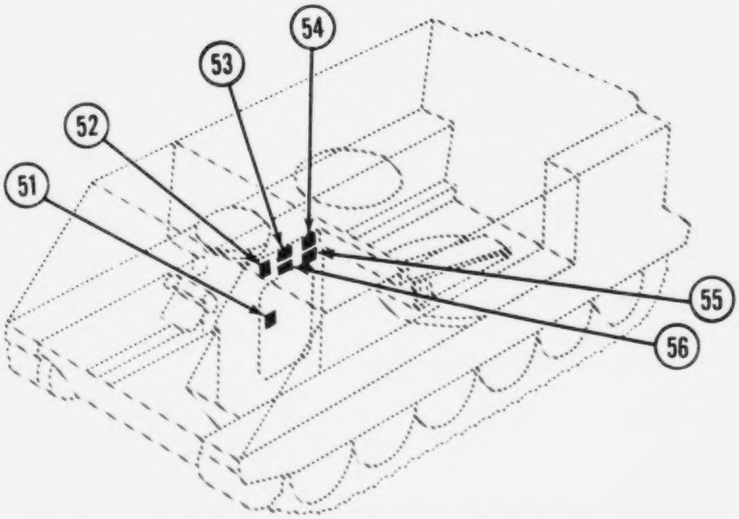
TA 158980

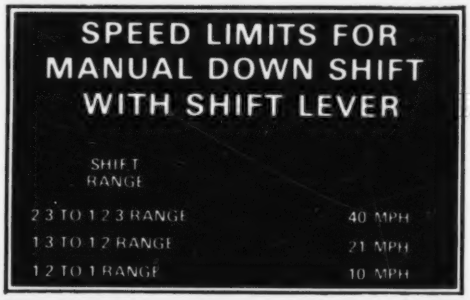
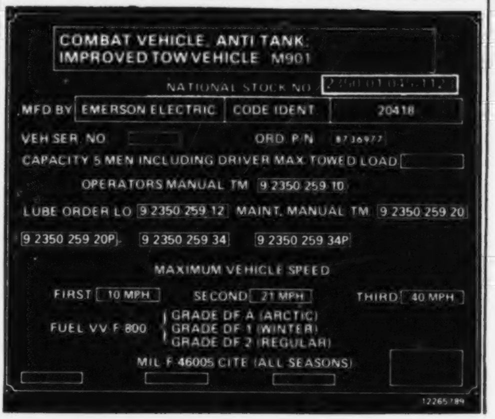
INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
46.	 RAMP DOWN RAMP UP	Decal (plate) black background, white letters	Right of driver
47.	 PULL TO STOP ENGINE PUSH BEFORE START	Decal (sticker) white background, black letters	Front right of driver
48.	 WARNING STALL CHECK TRANSMISSION AND ENGINE IN 2-3 RANGE ONLY	Decal (plate) black background, white letters	Right of driver
49.	 RAMP RAMP OPERATION TO LOWER RAMP 1. PLACE GEAR SHIFT LEVER IN NEUTRAL 2. PLACE RAMP LOCK LEVER IN MAXIMUM UNLOCK POSITION 3. MOVE RAMP ACTUATING LEVER TO DOWN TO RAISE RAMP 1. PLACE GEAR SHIFT LEVER IN NEUTRAL 2. START ENGINE 3. MOVE RAMP LOCK LEVER TO MAXIMUM UNLOCK POSITION. TO RAISE AND HOLD RAMP HOOKS HIGH AS POSSIBLE 4. MOVE RAMP ACTUATING LEVER TO UP 5. REGULATE RAISING SPEED WITH THROTTLE 6. WHEN RAMP IS CLOSED, MOVE RAMP LOCK LEVER TO LOCK POSITION	Decal (plate) black background, white letters	Right of driver
50.	 CAUTION EXCEPT IN EMERGENCY BRAKING DO NOT USE PIVOT STEER AT SPEEDS IN EXCESS OF 15 MPH OR IN GEARS ABOVE THE 1-2 RANGE	Decal (plate) white background, red letters	Right of driver

TA 071093

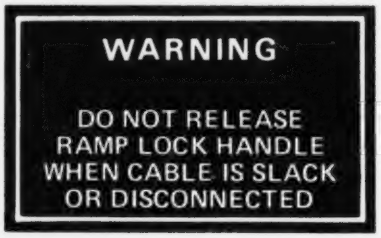
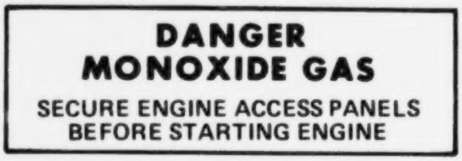
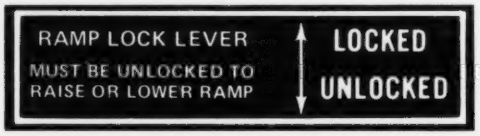
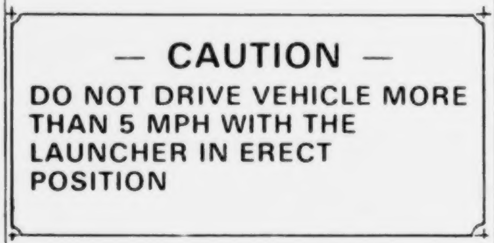
INTERNAL SIGNS AND DECALS



Item No.	Information	Type	Remarks
51	 SPEED LIMITS FOR MANUAL DOWN SHIFT WITH SHIFT LEVER SHIFT RANGE 2 3 TO 1 2 3 RANGE 40 MPH 1 3 TO 1 2 RANGE 21 MPH 1 2 TO 1 RANGE 10 MPH	Decal (plate) black background, white letters	On power plant access panel
52	 COMBAT VEHICLE, ANTI TANK: IMPROVED TOW VEHICLE M901 NATIONAL STOCK NO [illegible] MFD BY EMERSON ELECTRIC CODE IDENT 20418 VEH SER NO ORD P/N 8736977 CAPACITY 5 MEN INCLUDING DRIVER MAX TOWED LOAD OPERATORS MANUAL TM 9 2350 259 10 LUBE ORDER LO 9 2350 259 12 MAINT. MANUAL TM 9 2350 259 20 9 2350 259 20P, 9 2350 259 34 9 2350 259 34P MAXIMUM VEHICLE SPEED FIRST 10 MPH SECOND 21 MPH THIRD 40 MPH FUEL VV F 800 { GRADE DF A (ARCTIC) GRADE DF 1 (WINTER) GRADE DF 2 (REGULAR) MIL F 46005 CITE (ALL SEASONS) 12265789	Decal (plate) black background, white letters	Above power plant access panel

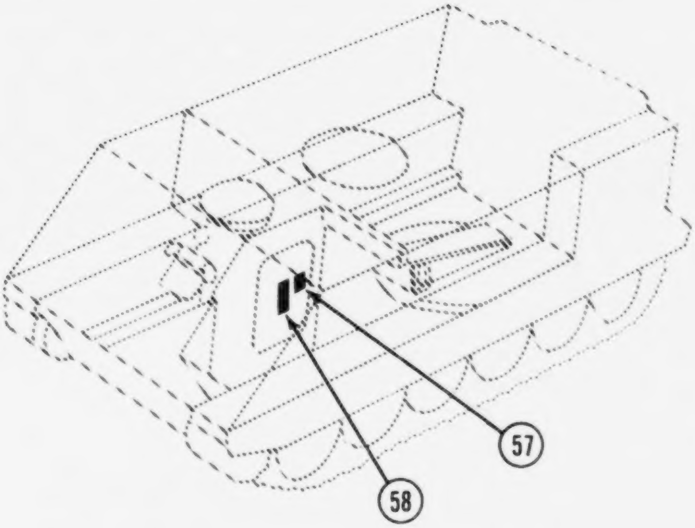
TA 071094

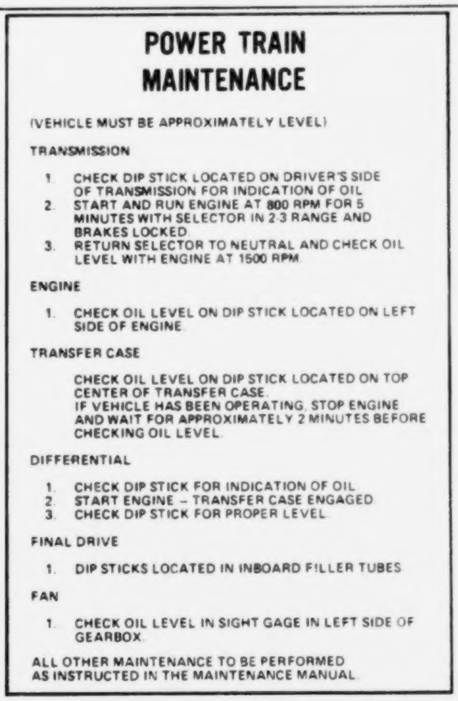
INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
53.	 WARNING DO NOT RELEASE RAMP LOCK HANDLE WHEN CABLE IS SLACK OR DISCONNECTED	Decal (plate) red background, white letters	Above power plant access panel
54.	 DANGER MONOXIDE GAS SECURE ENGINE ACCESS PANELS BEFORE STARTING ENGINE	Decal (sticker) white background, red letters	Above power plant access panel
55.	 RAMP LOCK LEVER MUST BE UNLOCKED TO RAISE OR LOWER RAMP ↕ LOCKED UNLOCKED	Decal (plate) black background, white letters	Above power plant access panel
56.	 — CAUTION — DO NOT DRIVE VEHICLE MORE THAN 5 MPH WITH THE LAUNCHER IN ERECT POSITION	Decal (plate) yellow background, black letters	Above power plant access panel

TA 157982

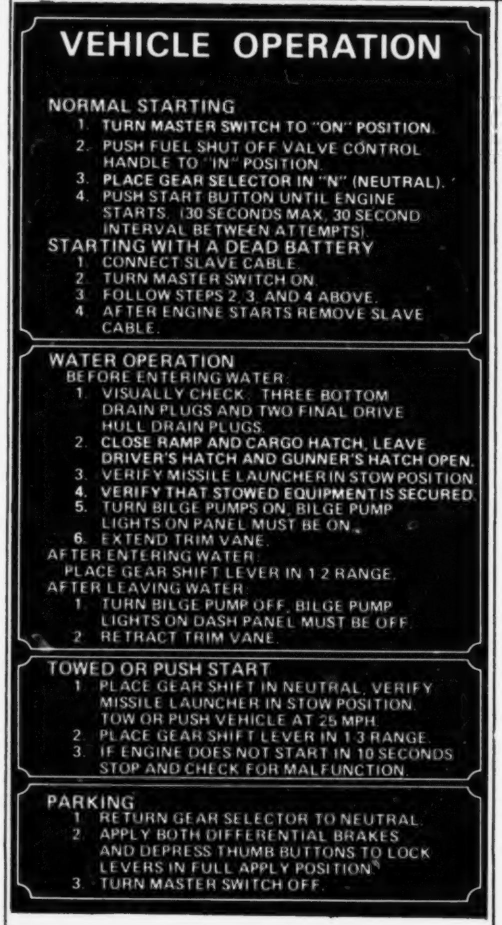
INTERNAL SIGNS AND DECALS



Item No.	Information	Type	Remarks
57.	 **POWER TRAIN MAINTENANCE** (VEHICLE MUST BE APPROXIMATELY LEVEL) TRANSMISSION 1. CHECK DIP STICK LOCATED ON DRIVER'S SIDE OF TRANSMISSION FOR INDICATION OF OIL 2. START AND RUN ENGINE AT 800 RPM FOR 5 MINUTES WITH SELECTOR IN 2-3 RANGE AND BRAKES LOCKED. 3. RETURN SELECTOR TO NEUTRAL AND CHECK OIL LEVEL WITH ENGINE AT 1500 RPM. ENGINE 1. CHECK OIL LEVEL ON DIP STICK LOCATED ON LEFT SIDE OF ENGINE. TRANSFER CASE CHECK OIL LEVEL ON DIP STICK LOCATED ON TOP CENTER OF TRANSFER CASE. IF VEHICLE HAS BEEN OPERATING, STOP ENGINE AND WAIT FOR APPROXIMATELY 2 MINUTES BEFORE CHECKING OIL LEVEL. DIFFERENTIAL 1. CHECK DIP STICK FOR INDICATION OF OIL. 2. START ENGINE – TRANSFER CASE ENGAGED. 3. CHECK DIP STICK FOR PROPER LEVEL. FINAL DRIVE 1. DIP STICKS LOCATED IN INBOARD FILLER TUBES FAN 1. CHECK OIL LEVEL IN SIGHT GAGE IN LEFT SIDE OF GEARBOX. ALL OTHER MAINTENANCE TO BE PERFORMED AS INSTRUCTED IN THE MAINTENANCE MANUAL.	Decal (plate) black background, white letters	On power plant access panel

TA 071096

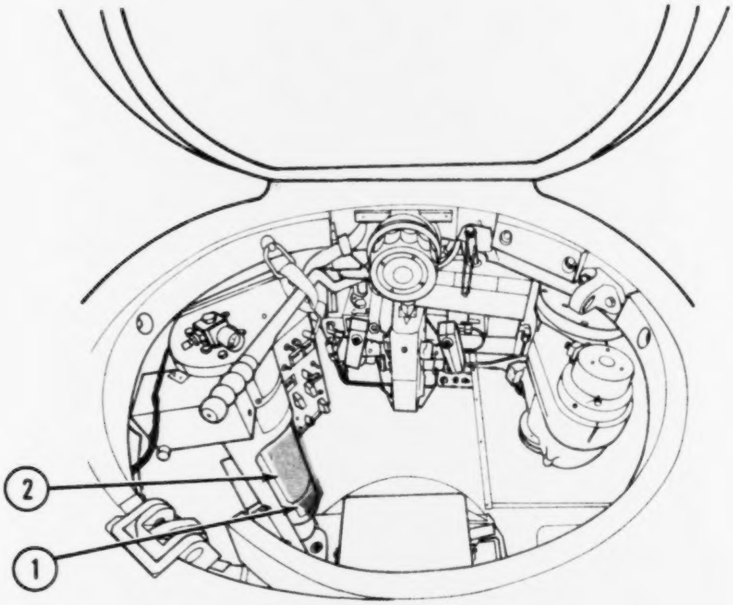
INTERNAL SIGNS AND DECALS

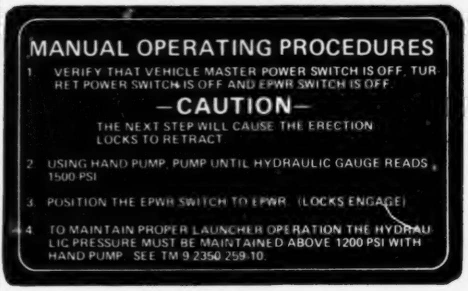
Item No.	Information	Type	Remarks
58.	 VEHICLE OPERATION NORMAL STARTING 1. TURN MASTER SWITCH TO "ON" POSITION. 2. PUSH FUEL SHUT OFF VALVE CONTROL HANDLE TO "IN" POSITION. 3. PLACE GEAR SELECTOR IN "N" (NEUTRAL). 4. PUSH START BUTTON UNTIL ENGINE STARTS. (30 SECONDS MAX, 30 SECOND INTERVAL BETWEEN ATTEMPTS). STARTING WITH A DEAD BATTERY 1. CONNECT SLAVE CABLE. 2. TURN MASTER SWITCH ON. 3. FOLLOW STEPS 2, 3, AND 4 ABOVE. 4. AFTER ENGINE STARTS REMOVE SLAVE CABLE. WATER OPERATION BEFORE ENTERING WATER: 1. VISUALLY CHECK: THREE BOTTOM DRAIN PLUGS AND TWO FINAL DRIVE HULL DRAIN PLUGS. 2. CLOSE RAMP AND CARGO HATCH, LEAVE DRIVER'S HATCH AND GUNNER'S HATCH OPEN. 3. VERIFY MISSILE LAUNCHER IN STOW POSITION. 4. VERIFY THAT STOWED EQUIPMENT IS SECURED. 5. TURN BILGE PUMPS ON, BILGE PUMP LIGHTS ON PANEL MUST BE ON. 6. EXTEND TRIM VANE. AFTER ENTERING WATER: PLACE GEAR SHIFT LEVER IN 1 2 RANGE. AFTER LEAVING WATER: 1. TURN BILGE PUMP OFF, BILGE PUMP LIGHTS ON DASH PANEL MUST BE OFF. 2. RETRACT TRIM VANE. TOWED OR PUSH START 1. PLACE GEAR SHIFT IN NEUTRAL, VERIFY MISSILE LAUNCHER IN STOW POSITION. TOW OR PUSH VEHICLE AT 25 MPH. 2. PLACE GEAR SHIFT LEVER IN 1 3 RANGE. 3. IF ENGINE DOES NOT START IN 10 SECONDS STOP AND CHECK FOR MALFUNCTION. PARKING 1. RETURN GEAR SELECTOR TO NEUTRAL. 2. APPLY BOTH DIFFERENTIAL BRAKES AND DEPRESS THUMB BUTTONS TO LOCK LEVERS IN FULL APPLY POSITION. 3. TURN MASTER SWITCH OFF.	Decal (plate) black background, white letters	On power plant access panel

TA 071097

INTERNAL SIGNS AND DECALS

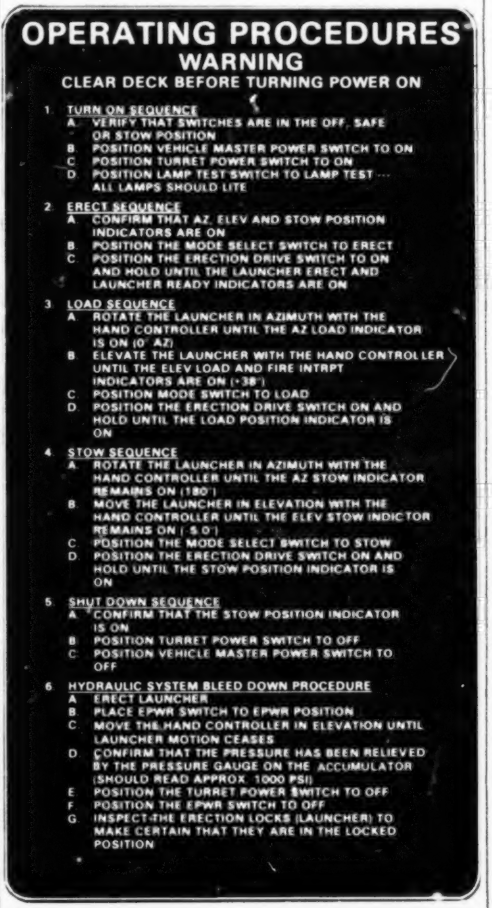
TURRET



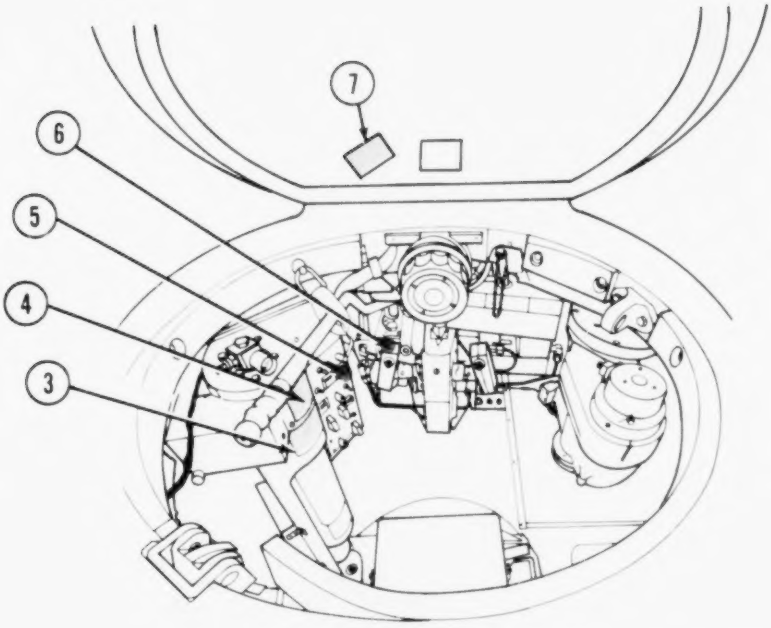
Item No.	Information	Type	Remarks
1.	 MANUAL OPERATING PROCEDURES 1. VERIFY THAT VEHICLE MASTER POWER SWITCH IS OFF, TURRET POWER SWITCH IS OFF AND EPWR SWITCH IS OFF. —CAUTION— THE NEXT STEP WILL CAUSE THE ERECTION LOCKS TO RETRACT. 2. USING HAND PUMP, PUMP UNTIL HYDRAULIC GAUGE READS 1500 PSI 3. POSITION THE EPWR SWITCH TO EPWR. (LOCKS ENGAGE) 4. TO MAINTAIN PROPER LAUNCHER OPERATION THE HYDRAULIC PRESSURE MUST BE MAINTAINED ABOVE 1200 PSI WITH HAND PUMP. SEE TM 9-2350-259-10.	Decal (plate) black background, white letters	Attached to accumulator

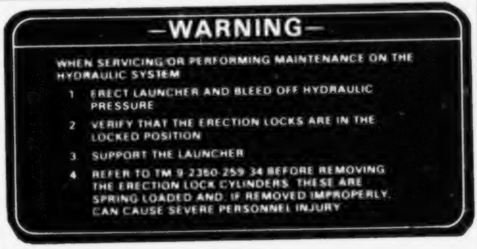
TA 071098

INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
2.	 OPERATING PROCEDURES WARNING CLEAR DECK BEFORE TURNING POWER ON 1. TURN ON SEQUENCE A. VERIFY THAT SWITCHES ARE IN THE OFF, SAFE OR STOW POSITION B. POSITION VEHICLE MASTER POWER SWITCH TO ON C. POSITION TURRET POWER SWITCH TO ON D. POSITION LAMP TEST SWITCH TO LAMP TEST --- ALL LAMPS SHOULD LITE 2. ERECT SEQUENCE A. CONFIRM THAT AZ, ELEV AND STOW POSITION INDICATORS ARE ON B. POSITION THE MODE SELECT SWITCH TO ERECT C. POSITION THE ERECTION DRIVE SWITCH TO ON AND HOLD UNTIL THE LAUNCHER ERECT AND LAUNCHER READY INDICATORS ARE ON 3. LOAD SEQUENCE A. ROTATE THE LAUNCHER IN AZIMUTH WITH THE HAND CONTROLLER UNTIL THE AZ LOAD INDICATOR IS ON (0° AZ) B. ELEVATE THE LAUNCHER WITH THE HAND CONTROLLER UNTIL THE ELEV LOAD AND FIRE INTRPT INDICATORS ARE ON (+38°) C. POSITION MODE SWITCH TO LOAD D. POSITION THE ERECTION DRIVE SWITCH ON AND HOLD UNTIL THE LOAD POSITION INDICATOR IS ON 4. STOW SEQUENCE A. ROTATE THE LAUNCHER IN AZIMUTH WITH THE HAND CONTROLLER UNTIL THE AZ STOW INDICATOR REMAINS ON (180°) B. MOVE THE LAUNCHER IN ELEVATION WITH THE HAND CONTROLLER UNTIL THE ELEV STOW INDICTOR REMAINS ON (-5.0°) C. POSITION THE MODE SELECT SWITCH TO STOW D. POSITION THE ERECTION DRIVE SWITCH ON AND HOLD UNTIL THE STOW POSITION INDICATOR IS ON 5. SHUT DOWN SEQUENCE A. CONFIRM THAT THE STOW POSITION INDICATOR IS ON B. POSITION TURRET POWER SWITCH TO OFF C. POSITION VEHICLE MASTER POWER SWITCH TO OFF 6. HYDRAULIC SYSTEM BLEED DOWN PROCEDURE A. ERECT LAUNCHER B. PLACE EPWR SWITCH TO EPWR POSITION C. MOVE THE HAND CONTROLLER IN ELEVATION UNTIL LAUNCHER MOTION CEASES D. CONFIRM THAT THE PRESSURE HAS BEEN RELIEVED BY THE PRESSURE GAUGE ON THE ACCUMULATOR (SHOULD READ APPROX. 1000 PSI) E. POSITION THE TURRET POWER SWITCH TO OFF F. POSITION THE EPWR SWITCH TO OFF G. INSPECT THE ERECTION LOCKS (LAUNCHER) TO MAKE CERTAIN THAT THEY ARE IN THE LOCKED POSITION	Decal (plate) black background, white letters	Attached to accumulator

TA 071099



Item No.	Information	Type	Remarks
3.	 —WARNING— WHEN SERVICING OR PERFORMING MAINTENANCE ON THE HYDRAULIC SYSTEM 1 ERECT LAUNCHER AND BLEED OFF HYDRAULIC PRESSURE 2 VERIFY THAT THE ERECTION LOCKS ARE IN THE LOCKED POSITION 3 SUPPORT THE LAUNCHER 4 REFER TO TM 9-2350-259-34 BEFORE REMOVING THE ERECTION LOCK CYLINDERS. THESE ARE SPRING LOADED AND, IF REMOVED IMPROPERLY, CAN CAUSE SEVERE PERSONNEL INJURY	Decal (plate) black background, white letters	On accumulator

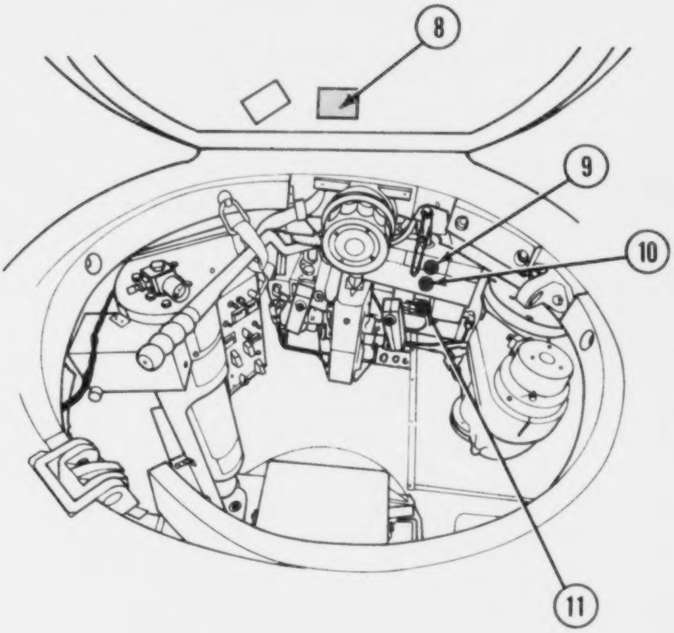
TA 112667

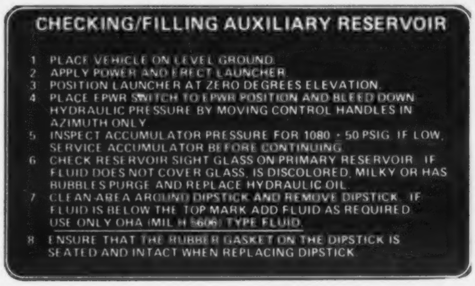
INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
4.	—CAUTION— 1 WHEN REMOVING ACCUMULATOR OR ASSOCIATED FITTINGS ALWAYS BLEED THE SYSTEM HYDRAULIC PRESSURE AND RELEASE THE NITROGEN PRE-CHARGE PRESSURE FIRST 2 AFTER REPLACING THE ACCUMULATOR PRE-CHARGE IT WITH DRY NITROGEN TO 1030 PSI	Decal (plate) black background, white letters	On accumulator
5.	WARNING INSTALL CARD RACK WITH AN960C10L WASHERS MS51958-62 SCREWS ONLY 12266835	Decal (plate) aluminum background, red letters	On gunner's control panel
6.	CAUTION RELEASE FLUID PRESSURE FROM ACCUMULATOR BEFORE FILLING RESERVOIR.	Decal (plate) aluminum background, black letters	On hydraulic reservoir
7.	WARNING BE SURE HOLD OPEN LATCH IS SECURELY ENGAGED BEFORE OPERATING VEHICLE WITH HATCH IN THE OPEN POSITION.	Decal (sticker) red background, white letters	On gunner's hatch cover

TA 071101

INTERNAL SIGNS AND DECALS



Item No.	Information	Type	Remarks
8.	 CHECKING/FILLING AUXILIARY RESERVOIR 1 PLACE VEHICLE ON LEVEL GROUND. 2 APPLY POWER AND ERECT LAUNCHER. 3 POSITION LAUNCHER AT ZERO DEGREES ELEVATION. 4 PLACE EPWR SWITCH TO EPWR POSITION AND BLEED DOWN HYDRAULIC PRESSURE BY MOVING CONTROL HANDLES IN AZIMUTH ONLY. 5 INSPECT ACCUMULATOR PRESSURE FOR 1080 ± 50 PSIG. IF LOW, SERVICE ACCUMULATOR BEFORE CONTINUING. 6 CHECK RESERVOIR SIGHT GLASS ON PRIMARY RESERVOIR. IF FLUID DOES NOT COVER GLASS, IS DISCOLORED, MILKY OR HAS BUBBLES PURGE AND REPLACE HYDRAULIC OIL. 7 CLEAN AREA AROUND DIPSTICK AND REMOVE DIPSTICK. IF FLUID IS BELOW THE TOP MARK ADD FLUID AS REQUIRED. USE ONLY OHA (MIL H 5606) TYPE FLUID. 8 ENSURE THAT THE RUBBER GASKET ON THE DIPSTICK IS SEATED AND INTACT WHEN REPLACING DIPSTICK.	Decal (sticker) black background, white letters	On gunner's hatch cover

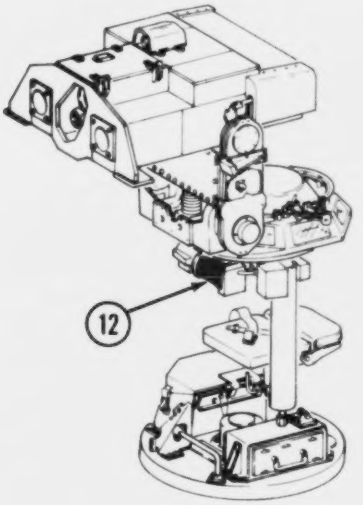
TA 071102

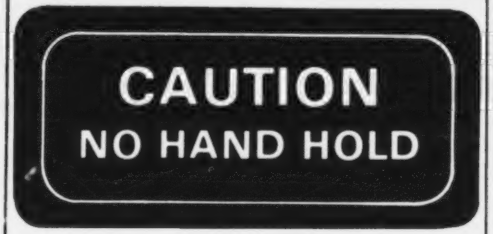
INTERNAL SIGNS AND DECALS

Item No.	Information	Type	Remarks
9.	CAUTION DO NOT OVERFILL RESERVOIR	Decal (plate) black background, white letters	On hydraulic reservoir
10.	— CAUTION — 1. DO NOT TURN OFF TURRET POWER UNLESS THE LAUNCHER IS IN THE STOW POSITION. 2. STOW ANTENNA AND CLOSE HATCHES PRIOR TO FIRING. 3. WEAR V-51R EAR PLUGS WHEN FIRING 4. LOOKING AT THE SUN OR OTHER BRIGHT LIGHTS THROUGH THE ITA CAN DAMAGE THE EYES. 5. STOW MACHINE GUN WHEN NOT IN USE	Decal (plate) black background, white letters	On hydraulic reservoir
11.	–CAUTION– IF HYDRAULIC FAILURE OCCURS WHEN ERECT DO NOT TURN TURRET POWER OFF. PLACE EPWR SWITCH IN "EPWR" POSITION TO INSURE THAT ERECTION LOCK REMAINS ENGAGED.	Decal (sticker) red background, white letters	In 2 places

TA 112668

INTERNAL SIGNS AND DECALS



Item No.	Information	Type	Remarks
12.	 CAUTION NO HAND HOLD	Decal (sticker) black background, white letters	On hydraulic unit

TA 071104

APPENDIX F

STOWAGE PLAN AND TIEDOWN STRAP GUIDE

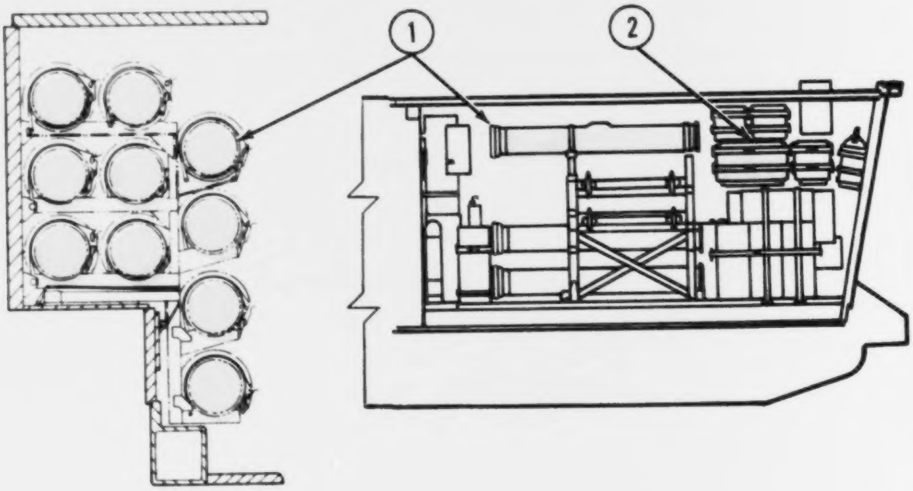
The stowage plan is intended as an aid in storing equipment where it belongs and in finding equipment readily when needed. (This information is in addition to the sign guide which marks the stowage location of many items.)

The internal stowage plan for the Mechanized Infantry vehicle is different from that of the Armored Cavalry vehicle; for externally stowed items the plans are similar. Differences are pointed out as they occur.

NOTE

The strap lengths given do not include buckle lengths unless otherwise indicated. All straps are 1-inch-wide unless otherwise indicated.

INTERNALLY STOWED EQUIPMENT – ARMORED CAVALRY
RIGHT WALL



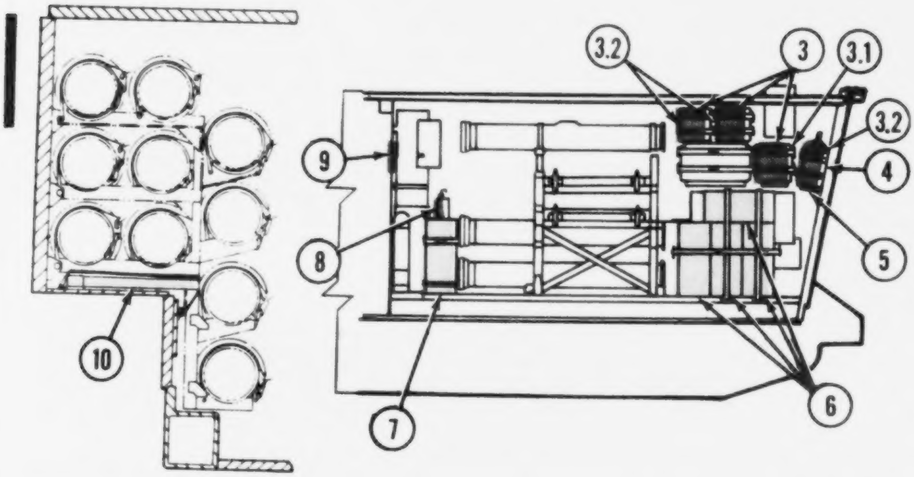
Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
1.	ENCASED MISSILE (10 ea)	10190635-4 (20)	19*
2.	NIGHTSIGHT COLLIMATOR (w/case) (1 ea)	8690482 (2)	64

* Length includes buckle.

TA 157983

INTERNALLY STOWED EQUIPMENT – ARMORED CAVALRY

RIGHT WALL



Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
3.	NIGHTSIGHT COOLANT CARTRIDGES (w/case) (3 cases) (M901)	8690476 (6)	45
3.1	NIGHTSIGHT BATTERY POWER CONDITIONER (M901A1)	8690476 (2)	45
3.2	NIGHTSIGHT BATTERY POWER CONDITIONER BATTERIES (M901A1)	8690476 (6)	45
4.	FIRE EXTINGUISHER, portable (1 ea)	8690468 (2) clamp assembly 7013845 (2)	24
5.	NIGHTSIGHT BATTERIES (w/case) (1 case) (M901)	8690472 (1)	33
6.	7.62MM AMMUNITION (w/case) (4 cases)	8690492 (4)	104

TA 159288

INTERNALLY STOWED EQUIPMENT – ARMORED CAVALRY

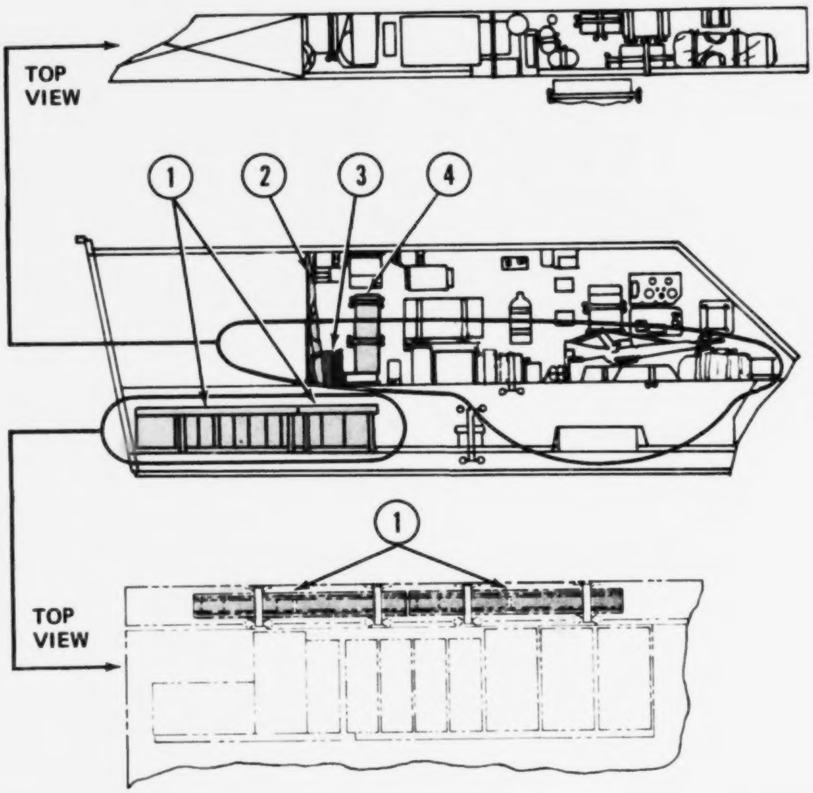
RIGHT WALL

Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
7.	7.62MM AMMUNITION (w/case) (1 case)	8690482 (2)	64
8.	M17 PERISCOPE	NONE	
9.	PAMPHLET BAG	NONE	
10.	LOWER TRIPOD STOW BRACKET (when removed from floor)	8690481 (1)	60

TA 159289

INTERNALLY STOWED EQUIPMENT – ARMORED CAVALRY

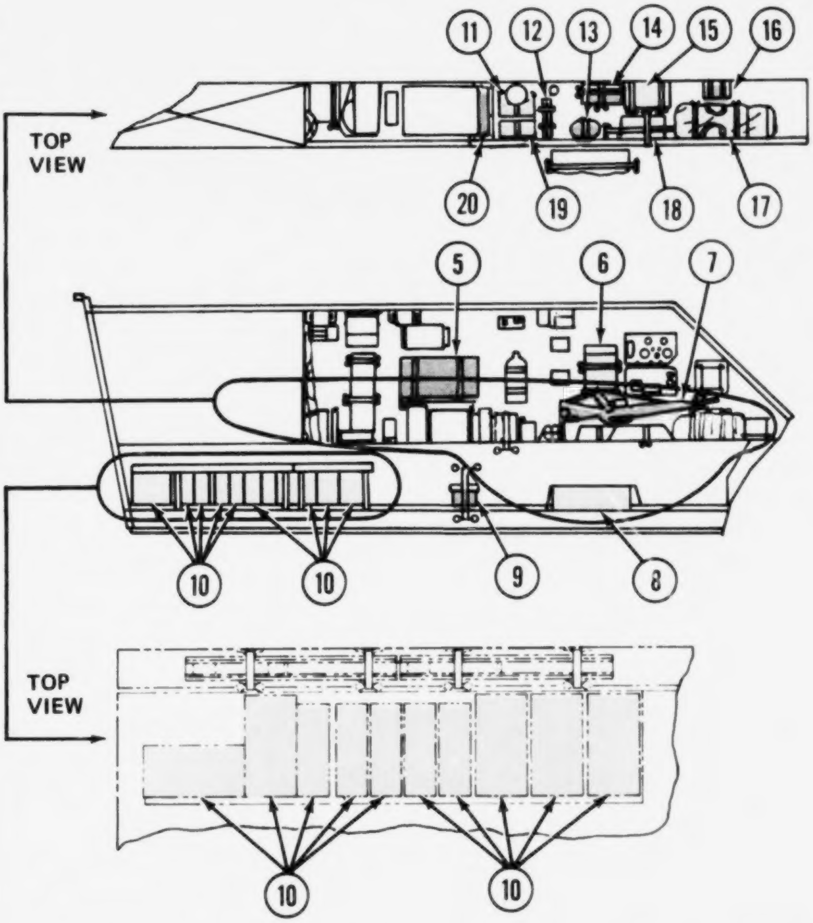
LEFT WALL



Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
1.	LAW MISSILE (3 ea)	8690472 (4)	33
2.	SPARE BARREL AND CLEANING EQUIPMENT for M60 machinegun (1 ea)	8690465 (1)	18
3.	NIGHT GOGGLES (w/case) (1 case)	8690472 (1)	33
4.	FIELD RATIONS (1 case)	8690484 (2)	72

TA 157985

INTERNALLY STOWED EQUIPMENT – ARMORED CAVALRY


11
12
13
14
15
16
TOP VIEW
20
19
18
17
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TOP VIEW
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10

Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
5.	NIGHTSIGHT (1 ea)	8690485 (2)	76
6.	IR PERISCOPE (1 ea)	8690466 (1)	20
7.	M16 RIFLE (2 ea)	None	
8.	FIELD RATIONS (1 case)	8690473 (1)	36
9.	NIGHT GOGGLES (w/case) (1 case)	8690472 (1)	33

TA 157986

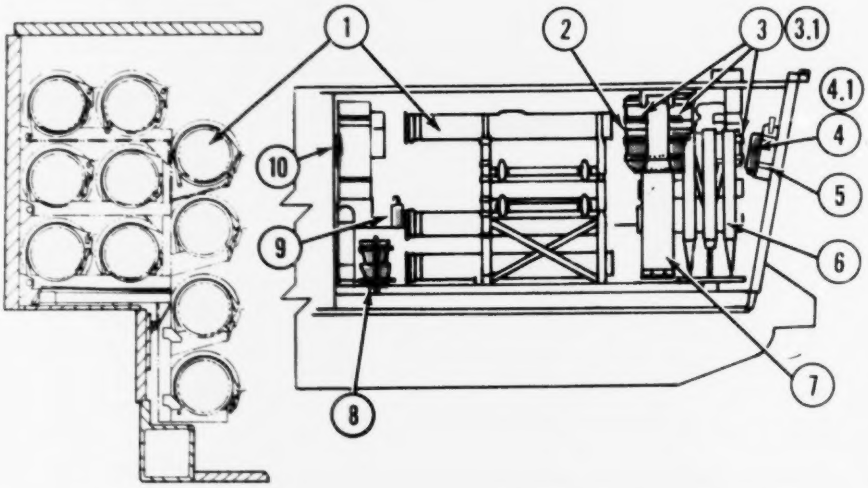
INTERNALLY STOWED EQUIPMENT – ARMORED CAVALRY

Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
10.	AMMUNITION IN CANS (10 cans)	None	
11.	CABLE REEL (w/wire) for telephone (1 ea)	8690476 (1)	45
12.	FLARES, ground signal, M158 (4 ea)	8690470 (2)	28
13.	BINOCULARS (1 ea)	8690472 (1)	33
14.	FIRST AID KIT (1 ea)	8690470 (1) 8690474 (1)	28 39
15.	AMMO BOX (1 ea)	8690470 (2)	28
16.	FIELD STOVE (1 ea)	8690472 (1)	33
17.	TOOL BAG (1 ea)	8690476 (2)	45
18.	TELEPHONE SET (1 ea)	8690476 (1) 8690482 (1)	45 64
19.	AMMO BOX (1 ea)	8690474 (1)	39
20.	SPARE MGS BATTERY	None	

TA 157987

INTERNALLY STOWED EQUIPMENT – MECHANIZED INFANTRY

RIGHT WALL



Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
1.	ENCASED MISSILE (10 ea)	10190635-4 (20)	19*
2.	NIGHTSIGHT COLLIMATOR (w/case) (1 ea)	8690482 (2)	64
3.	NIGHTSIGHT COOLANT CARTRIDGES (w/case) (3 cases) (M901)	8690476 (6)	45
3.1	NIGHTSIGHT BATTERY POWER CONDITIONER (M901A1)	8690476 (6)	45
4.	NIGHTSIGHT BATTERIES (w/case) (1 case) (M901)	8690476 (1)	45
4.1	NIGHTSIGHT BATTERY POWER CONDITIONER BATTERIES (M901A1)	8690476 (1)	45
5.	FIRE EXTINGUISHER, portable (1 ea)	8690468 (2) clamp assembly 7013845 (2)	24

* Length includes buckle.

TA 159290

INTERNALLY STOWED EQUIPMENT – MECHANIZED INFANTRY

RIGHT WALL

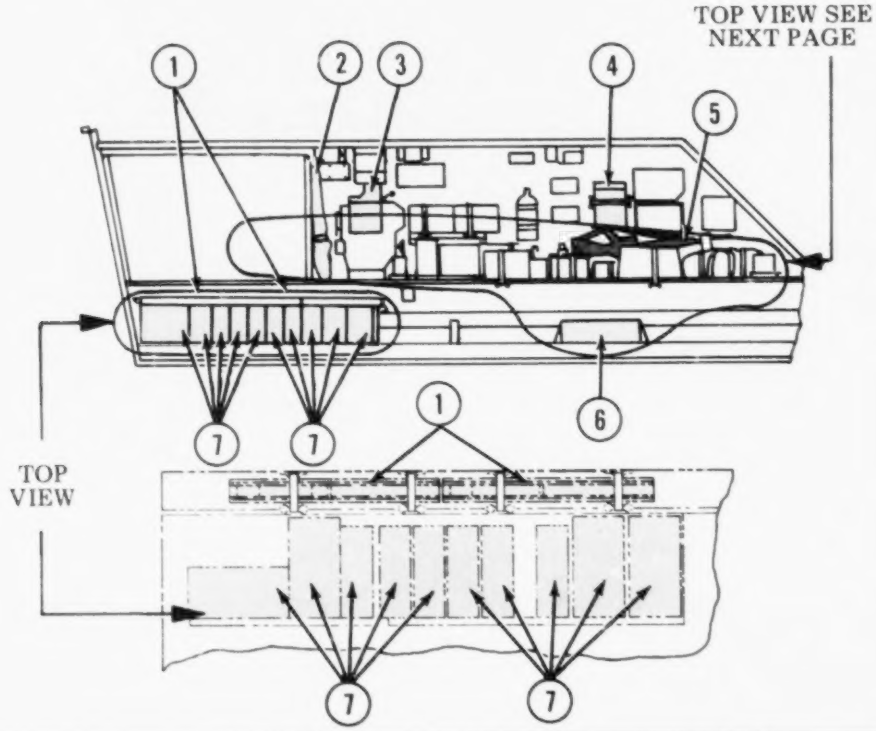
Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
6.	TRIPOD, M159E1 (1 ea)	8690536 (1)	88**
7.	LAUNCH TUBE, M21 (1 ea)	10190635-4 (1)	19*
8.	NIGHT VISION GOGGLES (w/case) (2 cases)	8690483 (1) 8690485 (2)	68 76
9.	M17 PERISCOPE	None	
10.	PAMPHLET BAG	None	

* Length includes buckle.
** Strap is 1 1/2-inches wide.

TA 159291

INTERNALLY STOWED EQUIPMENT – MECHANIZED INFANTRY

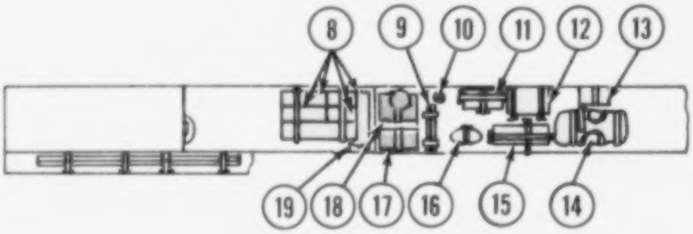
LEFT WALL



Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
1.	LAW MISSILE (3 ea)	8690472 (4)	33
2.	SPARE BARREL AND CLEANING EQUIPMENT for M60 machinegun (1 ea)	8690465 (1)	18
3.	TOW TRAVERSING UNIT (1 ea)	None	
4.	IR PERISCOPE (1 ea)	8690476 (1)	45
5.	M16 RIFLE (2 ea)	None	
6.	FIELD RATIONS (1 ea)	8690473 (1)	36
7.	AMMO CANS (10 cases)	None	

TA 157989

INTERNALLY STOWED EQUIPMENT – MECHANIZED INFANTRY

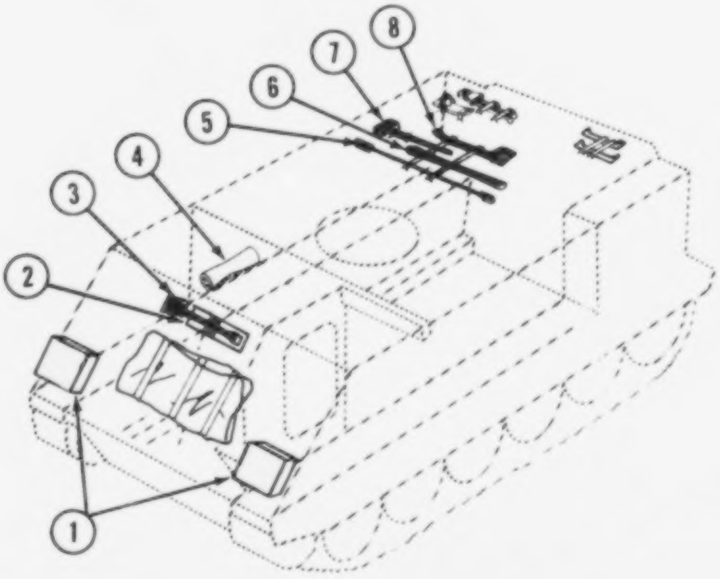


Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
8.	AMMO BOX (4 ea)	8690485 (2)	76
9.	FLARES, ground signal, M158 (4 ea)	8690470 (2)	28
10.	FLASHLIGHT (1 ea)	None	
11.	FIRST AID KIT (1 ea)	8690470 (1) 8690474 (1)	28 39
12.	AMMO BOX (1 ea)	8690470 (2)	28
13.	FIELD STOVE (1 ea)	8690472 (1)	33
14.	TOOL BAG (1 ea)	8690476 (2)	45
15.	TELEPHONE SET (1 ea)	8690476 (1) 8690482 (1)	45 64
16.	BINOCULARS (1 ea)	8690472 (1)	33
17.	AMMO BOX (1 ea)	8690474 (1)	39
18.	CABLE REEL (w/wire) for telephone (1 ea)	8690476 (1)	45
19.	SPARE MGS BATTERY (1 ea)	None	

TA 157990

EXTERNALLY STOWED ITEMS

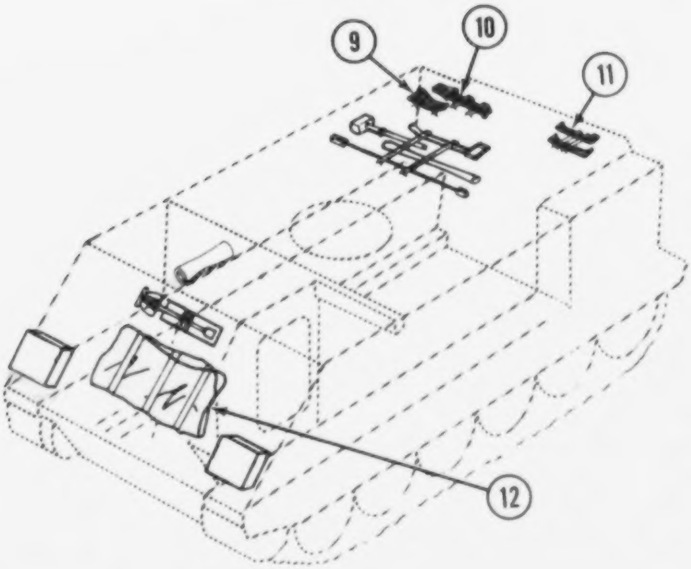
MECHANIZED INFANTRY AND ARMORED CAVALRY



Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
1.	SMOKE GRENADES (8 ea)	None	
2.	SPARE TRACK SHOES (2 ea)	None	
3.	SHOVEL (1 ea)	8690466 (1) 8690472 (1)	20 33
4.	GRILLE COVER (1 ea)	None	
5.	CROWBAR (1 ea)		
6.	MATTOCK HANDLE (1 ea)		
7.	SLEDGE HAMMER (1 ea)	8690476 (2)	45
8.	AXE (1 ea)	Note - Sledge hammer secured with: 8690476 (1) 8690459 (1)	45 6

TA 157991

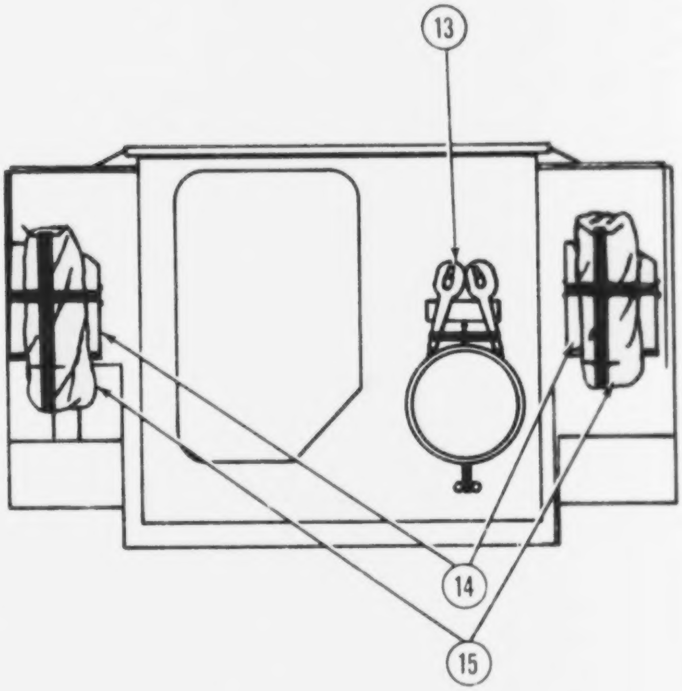
EXTERNALLY STOWED ITEMS



Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
9.	MATTOCK (1 ea)	8690465 (1)	18
10.	TRIPOD, machinegun (1 ea) (Armored Cavalry only)	8690468 (2)	24
11.	TRACK FIXTURES (2 ea)	8690470 (2)	28
12.	SCREEN, camouflage (1 ea) (Mechanized Infantry only)	8690505 (3)	180

TA 157992

EXTERNALLY STOWED ITEMS



Item No.	Description and Qty	Tiedown Straps (Part No. and Qty)	Strap Length (Inches)
13.	TOW CABLE (1 ea)	8690513 (1) 8690519 (1)	18* 30*
14.	WATER CAN (1 ea)	8690532 (2)	72*
15.	DUFFLE BAG (2 ea) (Mechanized Infantry only)	8690536 (2) 8690538 (2)	88* 96*

* Strap is 1 1/2-inches wide.

TA 157993

INDEX

Page

- A -

Accumulator, Hydraulic
    Location and Description 1-16
Acquisition and Tracking
    Inground Mode 2-184
    On Vehicle 2-160.1
Actuator Assembly Friction Drive Hubs 2-102.76
Air Box Heater
    Preventive Maintenance Checks and Services 2-87
    Purging 3-66
    Purpose and Use 2-106
Air Box Heater Accumulator (PMCS) 2-74
Air Cleaner Element
    Cleaning 3-52
    Installation 3-53
    Preventive Maintenance Checks and Services 2-102.19
    Removal 3-51
Air Cleaner Restriction Indicator
    Preventive Maintenance Checks and Services 2-94
    Purpose and Use 2-7
Air Intake Grille 1-7
Air Intake System 1-24,1-25
Ammunition
    Machinegun Ammunition 4-10
    Smoke Grenades 4-13
    TOW Missiles 4-1
Amplifier, Intercom
    Controls and Indicators 2-28
    Location and Description 1-12
    Operation and Use 2-122
    Preventive Maintenance Checks and Services 2-73
Amplifier-Power Supply
    Controls and Indicators 2-31
    Location and Description 1-12
ANT FREQ (Antenna Frequency)
    CONTROL, Amplifier-Power Supply 2-31
Antenna and Mount, Vehicle
    Location and Description 1-8
Antenna Mount, Radio Receiver-Transmitter 2-34
Area Search and Target Acquisition 2-120
Assemblies, Major 1-1
Auxiliary Power Receptacle 2-1
Azimuth Adjustment Knob, Boresight Collimator 2-58.1

TA 159292

- Azimuth Boresight Knob
  - Daysight/Tracker ... 2-52
  - Nightsight ... 2-52.1
- Azimuth Control Knob
  - Squad Leader's Periscope ... 2-20
  - Traversing Unit ... 2-57
- Azimuth Lock
  - Quick Release (M19 Periscope Mount) ... 2-17
  - TOW Traversing Unit ... 2-57

- B -

- Backblast Caution and Danger Zones ... 2-130
- Batteries, Vehicle
  - Location and Description ... 1-14
  - Maintenance ... 3-55
  - Preventive Maintenance Checks and Services ... 2-92,2-102.33
- Battery, Collimator ... 2-154
- Battery, Emergency Power
  - Installation and Removal ... 2-145
  - Location and Description ... 1-15
  - Test and Replacement ... 3-60
  - Use in Tracking and Firing ... 2-198
- Battery, Missile Guidance Set ... 3-59
- Battery, Missile Guidance Set (PMCS) ... 2-102.69
- Battery, Nightsight ... 3-60.1
- Battery, Nightsight Power Conditioner
  - Controls and Indicators ... 2-58.2
  - Preventive Maintenance Checks and Services ... 2-78.1,2-79
  - Removal and Replacement ... 2-176.2
- Battle Override Switch ... 2-27
- Bellows, ITA (PMCS) ... 2-102.72
- Belt, Coolant Pump (See Coolant Pump Belt)
- Bilge Pumps
  - Maintenance ... 3-56.1
  - Preventive Maintenance Checks and Services ... 2-102.42
  - Sight Window ... 2-15
  - Theory of Operation ... 1-27
- Boresight Collimator (See Collimator, Boresight)
- Brackets, Erector-Launcher Stow Brackets (PMCS) ... 2-102.46
- Brackets, TOW Components Stowage (PMCS) ... 2-102.50
- Brakes, Vehicle
  - Controls and Indicators ... 2-7
  - Theory of Operation ... 1-26

TA 159293

- C -

Cable, TOW
  Location and Description 1-9
  Use in Securing Ramp 2-197
  Use in Towing Vehicle 2-195
Circuit Breaker Electrical Transient Suppressor 2-27
Circuit Breaker, Intercom Amplifier 2-28
Circuit Breaker, LT (Left) REMOTE ARM 2-38
Circuit Breaker, RT (Right) REMOTE ARM 2-37
Circuit Breaker, Turret Power 2-36
Clamp, Traversing Unit Coupling 2-56
Cleaning, Vehicle and Components 3-39
Clip Clothes, CVC Helmet 2-30
Collimator, Boresight
  Controls and Indicators 2-58.1
  Use in Boresighting 2-154
Communication Equipment (PMCS) 2-102.3
Connector, Antenna Radio Receiver-Transmitter 2-33
Connector, Radio Receiver-Transmitter (RT) Power 2-33
Connector, SET POWER Amplifier-Power Supply 2-31
Connectors, AUDIO, Radio Receiver-Transmitter 2-33
Control Assembly, Hand
  Controls and Indicators 2-39
  Location and Description 1-16
  Preventive Maintenance Checks and Services 2-102.60
  Use in MGS Self-Test 2-149
  Use in Stowing 2-165
  Use in Tracking and Slewing 2-160.1
Control Box, Intercom (See Intercom Control Box)
Control, DIM-BRT 2-36
Control, Hand Throttle 2-8.1
Control Handle, Fixed Fire Extinguisher
  Location and Description 1-7,2-26
  Preventive Maintenance Checks and Services 2-67
Control, Volume, Radio Receiver-Transmitter 2-33
Coolant Cartridge Replacement (M901) 3-61
Coolant Pump Belt
  Maintenance 3-54
Cooling System, Vehicle
  Extreme Hot Weather Maintenance 3-70
  Maintenance 3-56.1,3-57
  Preventive Maintenance Checks and Services 2-76
  Theory of Operation 1-24.1,1-25
Cylinders, Erection Arm/Hydraulic
  Lock (PMCS) 2-102.66

- D -

Daysight/Tracker
- Controls and Indicators 2-52
- Installation and Alinement 2-135,2-181
- Location and Description 1-15
- Preventive Maintenance Checks and Services 2-102.57
- Removal 2-144
- Test and Replacement 3-60

Description and Use of Operator's Controls and Indicators 2-1
Detent Plunger 2-43
Detent Stop Lever, Tripod 2-56
Dial, Frequency, Radio Receiver-Transmitter 2-33
Differential Oil Level 2-66
Differential Oil Level (PMCS) 2-70
Differential Steering Levers (See Steering Levers, Differential)
Diopter Ring, Daysight/Tracker 2-52
Diopter Ring, Nightsight 2-55

Disconnect Controls, Engine
- Description 2-10
- Use in Starting Engine 2-106

Distance to Target Estimation 2-121

Dome Lights
- Controls 2-20
- Location and Description 1-11
- Replacement of Lamps 3-62.1

Door Controls, Power Plant 2-13
Driver's Compartment 1-10
Driver's Control Panel (See Panel, Driver's Control)

Driver's Hatch
- Cleaning 2-40.1
- Controls 2-11
- Location and Description 1-7
- Preventive Maintenance Checks and Services 2-102.29

Driver's Seat
- Location and Description 1-13
- Operation and Controls 2-14

Driving 1-26,2-108
Driving Precautions 2-108

Duds
- Smoke Grenades 2-174
- TOW Missile 2-164.3

TA 159295

- E -

EIR's, Reporting of 1-2
Elapsed Time Meter
    On Fire Interrupt/Intercommunications Assembly 2-47
    On Tachometer 2-5
Electrical Connector, Trailer 1-9
Elevation Adjustment Knob, Boresight Collimator 2-58.1
Elevation Boresight Knob
    Daysight/Tracker 2-52
    Nightsight 2-54
Elevation Control Knob
    Squad Leader's Periscope 2-19
    TOW Traversing Unit 2-57
Elevation Lock, TOW Traversing Unit 2-57
Emergency Operation of Combat Vehicle 2-193
Emergency Power Battery (See Battery, Emergency Power)
Encased Missile (See Missile, TOW)
Engine Airbox Drain (PMCS) 2-102.22
Engine Compartment (PMCS) 2-68
Engine Coolant
    Combat Lock 2-23
    Filler Location and Description 1-7
    Preventive Maintenance Checks and Services 2-76
Engine Cooling System 1-24.1,1-25
Engine Oil, Check and Replenishment 2-84
Engine Shutdown 2-108
    Preventive Maintenance Checks and Services 2-102.6
Engine Startup
    By Towing 2-192
    In Cold Weather 2-105
    In Extremely Cold Weather 2-189
    In Mild Weather 2-103
    With Outside Power 2-193
Erection Arm 1-15
Erection of Launcher
    Preventive Maintenance Checks and Services....... 2-102.63
    Theory of Operation 1-30,1-33
    Under Normal Conditions
        From Load Position 2-160.1
        From Stow Position 2-146
    With Emergency Power 2-198
Exhaust
    Grille and Pipe Location 1-7
    Preventive Maintenance Checks and Services 2-102.41
    System Principles of Operation 1-24.1,1-25
Exterior Leaks (PMCS) 2-66
Exterior Pull Handle 1-70

Extreme Hot Weather Maintenance 3-69
Eyecup, Squad Leader's Periscope 2-19
Eyecup, Image Transfer Assembly 2-49

- F -

Fan Belt
  Maintenance 3-53
  Preventive Maintenance Checks and Services 2-99
Fan Gear Box Oil Level (PMCS) 2-85
Features and Capabilities 1-5
Feet/Anchor Claws, Tripod 2-56
Final Drives
  Draining of Housing 3-69
  Preventive Maintenance Checks
    and Services 2-72,2-102.10
  Theory of Operation 1-23
Fire Extinguisher Control, External 2-26
Fire Extinguisher, Fixed
  Preventive Maintenance Checks and Services 2-80
  Purpose and Use 2-26
Fire Extinguisher, Portable
  Preventive Maintenance Checks and Services 2-81
  Purpose and Use 2-26
Fire Interrupt Alarm 2-47
Fire Interrupt/Intercommunications Assembly
  Indicators 2-47
  Purpose and Use 2-47
Firing Angle Limitations 2-132
Firing Malfunctions 2-163
Flight Path Obstructions 2-131
Fluid, Hydraulic (PMCS) 2-102.59
Focus Control, Squad Leader's Periscope 2-19
Forms and Records 1-2
Frequencies, Setting of 2-125
Fuel
  Arctic 3-65
  Cutoff and Drain Valves 2-25
Fuel Filler
  Combat Lock 2-24
  Location and Description 1-9
  Use 2-23
Fuel Filters
  Draining of 3-55
  Preventive Maintenance Checks
    and Services 2-102.17

Fuel System
    Maintenance of 3-54
    Principles of Operation 1-24
    Purging of 3-65
Fuel Tank 1-12
    Preventive Maintenance Checks and Services 2-102.18
Fueling 3-54

- G -

Gage, Temperature 2-5
Gage, Temperature, Fuel Level, and RPM (PMCS) 2-90
Gas Particulate (PMCS) 2-102.39
Gear Shifting 2-112.1
Generator Belt
    Maintenance 3-53
Ground TOW Components 2-102.75
Gunner's Station (PMCS) 2-102.56,2-102.59,2-102.64

- H -

Hand Control Assembly (See Control Assembly, Hand)
Handle, Lock 2-56
Handle, Radio/Intercom CVC Helmet 2-30
Handset H-189R 2-30
Hangfires
    Machinegun Ammunition 2-169
Hatch, Cargo
    Controls 2-41
    Location and Description 1-9
    Preventive Maintenance Checks and Services 2-102.27
Hatch Cover, Driver's
    Controls and Indicators 2-11
    Location and Description 1-7
    Preventive Maintenance Checks and Services....... 2-102.29
Hatch/Fire Interrupt 2-133
    Preventive Maintenance Checks and Services 2-102.67
Hatch, Gunner's
    Controls 2-40
    Location and Description 1-15
    Preventive Maintenance Checks and Services 2-102.70
Headlights
    Location and Description 1-7
    Operation of 2-114
    Preventive Maintenance Checks and Services 2-95
Heater, Coolant
    Controls and Indicators 2-18
    Operation of 2-99
    Preventive Maintenance Checks and Services 2-73,2-98

TA 159298

Heater, Personnel
    Controls and Indicators 2-18
    Location and Description 1-14
    Preventive Maintenance Checks and Services 2-96
    Shutdown and Purging 2-176
    Starting and Operating 2-175
Helmet, CVC
    Controls 2-30
    Use 2-123
Hydraulic Supply Pump and Motor 1-16
Hydraulic System
    Depressurizing 2-134

- I -

Idler Wheel
    Location and Description 1-9
Image Transfer Assembly
    Cleaning 3-65
    Controls and Indicators 2-44
    Eye Protector Replacement 3-65
    Focus and Alinement Check 2-141
    Inspection and Test 3-65
    Lenses (PMCS) 2-102.77
Indicator, AZ LOAD 2-36
Indicator, AZ STOW 2-36
Indicator, Azimuth Position 2-46
Indicator, Battery Generator 2-4
Indicator, CARGO HATCH Interrupt 2-37
Indicator, Differential Oil 2-6
Indicator, DRIVER'S HATCH Interrupt 2-37
Indicator, Driver's Level 2-10
Indicator, ELEV LOAD 2-36
Indicator, ELEV STOW 2-38
Indicator, Engine Oil 2-6
Indicator, FIRE INTRPT 2-37
Indicator, Fuel Level 2-4
Indicator, Gunner's Level 2-45
Indicator, Headlights High Beam 2-6
Indicator, Humidity
    Lower ITA 2-102.71
    Missile Guidance Set 2-50
    Preventive Maintenance Checks and
        Services 2-102.39,2-102.71
    Squad Leader's Periscope 2-19
    Upper ITA 2-43
Indicator Lamps, Replacement 3-63
Indicator, LAUNCHER ERECT 2-36

TA 159299

- Indicator, LAUNCHER READY 2-36
- Indicator, LOAD POSITION 2-37
- Indicator, Missile LEFT ARMED 2-38
- Indicator, Missile LEFT SEL 2-38
- Indicator, Missile RIGHT ARMED 2-38
- Indicator, Missile RIGHT SEL 2-38
- Indicator, ON/OFF, Intercom Amplifier 2-28
- Indicator, POWER, Intercom Amplifier 2-28
- Indicator, READY TO LOAD 2-47
- Indicator, STOW POSITION 2-38
- Indicator, Transmission Oil 2-6
- Indicator, TRIGGER 2-39
- Indicator, TURRET POWER 2-36
- Indicator, WPN HATCH Interrupt 2-37
- Infrared Lights (PMCS) 2-102
- Infrared Stowage Receptacle 2-2
- Instrument Panel Lights (PMCS) 2-100
- Installation of
  - Daysight/Tracker
    - On TOW Traversing Unit 2-181
    - On Vehicle 2-134.1
  - Emergency Power Battery 2-145
  - Missile Guidance Set (MGS) 2-144.1
  - Nightsight
    - In Ground Emplaced Mode 2-181
    - On Vehicle 2-136.1
  - Periscope, M17 (Driver's) 3-58
  - Periscope, M19A1 (Infrared) 2-117
  - TOW Battery in MGS 3-59
  - TOW Launch Tube 2-180
  - TOW Traversing Unit 2-180
  - Windshield Kit 2-176.1
- INT ACCENT Switch, Intercom Amplifier 2-28
- Intercom Amplifier (See Amplifier, Intercom)
- Intercom Control Box
  - Controls and Indicators 2-28
  - Location and Description 1-11
  - Operation 2-122
- Intercom System, Operation of 2-122
- IR POWER Switch 2-3

- K -

- Knob, KC Tuning Control, Radio Receiver-Transmitter ... 2-32
- Knob, MC Tuning Control, Radio Receiver-Transmitter ... 2-33

- L -

- Lamp Test, Turret (PMCS) 2-102.59

Latch Assembly, Daysight/Tracker
    Purpose and Description 2-52
    Use 2-134.1
Latch, Launch Tube 2-57
Launcher Operation
    Elevation and Depression 2-186.7
    Erection from Stow 2-146
    Loading 2-157
    Stowing 2-164.3
Launcher, Principles of Operation
    Elevation and Azimuth Movement 1-31
    Erection from Load 1-33
    Erection of Launcher 1-30
    Movement to Load Position 1-32
    Preventive Maintenance Checks and
      Services 2-102.63,2-102.68
    Tracking and Firing 1-36
Leakage Definitions/Classes 2-60
Leaks
    Coolant 2-62
    Fuel 2-62,2-78
    Oil 2-62
Level Indicator, Launcher Tripod 2-56
Lever, Arming, TOW Traversing Unit 2-57
Lifting Eyes, Front 1-7
Lights (See Vehicle Lights)
Lights, Instrument Panel (See Indicators)
Loading of Smoke Grenades 2-171
Loading of TOW Missiles
    On Ground Emplaced Launcher 2-182
    On Vehicle Launcher 2-157
Loading with Emergency Power 2-199
Location and Description of Components 1-6
Lock, Azimuth Boresight Knob 2-53
Locking Handle, TOW Traversing Unit 2-57
Lubrication Instructions 3-1

- M -

Machinegun and Mount (PMCS) 2-102.61
Machinegun, M60
    Cleaning 3-40.1
    Dismounting 2-170
    Installation of 2-166
    Location and Description 1-6
    Maintenance 3-67
    Operation 2-166
    Unloading 2-168

TA 159301

Machinegun Traversing Rail 1-16
Maintenance of Fire Control Equipment 3-20
Maintenance of Vehicle 3-1
Major Components 1-1
Malfunctions
  Machinegun 2-169
  Missile Firing 2-163
  Smoke Grenade 2-173
Manual, Type 1-1
Master Switch Panel (See Panel, Master Switch)
Master Switch, Vehicle 2-1
Matching Unit - Base Antenna 2-34
Meter, Elapsed Time 2-47
METER, ELEVATION, Missile Guidance Set 2-50
Misfires
  Machinegun 2-169
  Smoke Grenade 2-173
  TOW Misile 2-163
Missile Firing Safety 2-130
Missile Guidance Set
  Controls and Indicators 2-50
  Installation and Removal 2-144.1
  Location and Description 1-15
  Preventive Maintenance Checks and Services 2-102.63
  Self-Test and TOW Weapon System Checkout (M901A1) 2-156.2
  Use in Firing Missiles 1-39
  Use in Self-Test (M901) 2-148,2-186.2
Missile Rack 1-14
  Preventive Maintenance Checks and Services 2-102.49
Missile, TOW
  Controls and Indicators 2-58
  Guidance Failure 2-164.3
  Handling of 4-3
  Hazard Classification 4-2
  Inspection of 4-7
  Loading on Ground Emplaced Launcher 2-182
  Loading on Vehicle 4-9
  Overpack and Encased Missile Markings 4-6
  Storage 4-4
  Theory of Operation 1-39
  Types 4-1
Missiles, Selection and Arming (M901) 2-186.12
Missiles, Selection and Arming (PMCS) 2-102.68
Manual Sight Select Switch 2-43

TA 159302

- N -

- Nightsight
  - Check and Alinement 2-152.1
  - Controls and Indicators 2-102.73
  - Installation 2-136.1
  - Location and Description 1-15
  - Preventive Maintenance Checks and Services 2-102.57,2-102.58
  - Removal and Storage 2-142.1
  - Replacement of Battery (M901) 3-60.1
  - Replacement of Coolant Cartridge (M901) 3-61
  - Test and Inspection 3-60
- Nightsight Collimator (PMCS) 2-102.48
- Nightsight Power Cable (PMCS) 2-102.74

- O -

- Operation in Extreme Cold 2-188
- Operation of
  - Communications Equipment 2-122
  - Dismounted TOW System 2-178
  - Engine Coolant Heater 2-190
  - Intercom Set 2-122
  - Machinegun in Extreme Weather 2-193
  - Machinegun, M60 2-166
  - Personnel Heater 2-175
  - Radio and Intercom 2-124
  - Radio in Dismounted Configuration 2-127
  - Smoke Greande Launchers 2-171
  - Telephone 2-129
  - Turret and Fire Control Equipment 2-134.1
  - Turret in Cold and Hot Weather 2-192
  - Turret in High Humidity 2-192
  - Turret in Override 2-202.1
  - Turret in Salt Water Areas 2-193
  - Vehicle Under Unusual Conditions 2-188
- Operator's Engine Access Panel and Seal (PMCS) 2.102.23
- Operator's Engine Compartment (PMCS) 2-83

- P -

- Panel, Driver's Control
  - Controls and Indicators 2-2
  - Location and Description 1-13
  - Preventive Maintenance Checks and Services 2-80
- Panel, Gunner's Control
  - Controls and Indicators 2-35
  - Location and Description 1-16
  - Purpose 1-16

TA 159303

- Panel, Master Switch
  - Controls and Indicators 2-1
  - Location and Description 1-13
- Panel, Warning Lights
  - Controls and Indicators 2-6
  - Location and Description 1-13
  - Preventive Maintenance Checks and Services 2-86,2-93
- Pedals, Accelerator 2-13
- Periscope, M17 (Driver's) 3-58
- Periscope, M19A1 (Infrared)
  - Installation and Use 2-117
  - Location and Description 1-7
  - Preventive Maintenance Checks and Services 2-102.35
  - Principles of Operation 1-28
  - Removal and Stowage 2-119
- Periscope, M26 1-6
- Periscope Mount (See Quick Release)
- Periscope, Squad Leader's
  - Controls and Indicators 2-19
  - Location and Description 1-7
  - Maintenance of 3-62
  - Operation of 2-120
  - Preventive Maintenance Checks and Services 2-102.38
- Periscopes and Vision Blocks 2-74
- Placing Vehicle in Motion 2-109
- POWER Switch, Intercom Amplifier 2-31
- Power Train 1-23
- Preset Controls, Radio Receiver-Transmitter
  - Description 2-33
  - Operation 2-125
- Pressure Gage, Turret Accumulator
  - Purpose and Use 2-48
- Preventive Maintenance Checks and Services (PMCS) 2-59
  - Table 2-1. Before 2-64
  - Table 2-1. During 2-90
  - Table 2-1. After.............................. 2-102.8
  - Table 2-1. Weekly 2-102.19
  - Table 2-1. Monthly 2-102.46
  - Table 2-1. Quarterly 2-102.52
- Purpose of Equipment 1-2

- Q -

- Quick Disconnect, CVC Helmet 2-30
- Quick Release
  - Operation of 2-119
  - Purpose and Use 2-17

- R -

Radio Communication Set
  Location and Description 1-11
  Operation of (Off Vehicle) 2-124
  Operation of (On Vehicle) 2-127
  Theory of Operation 1-28
Radio Receiver-Transmitter (See Receiver-Transmitter, Radio)
Ramp
  Controls 2-8
  Inoperable Ramp 2-197
  Location and Description 1-9
  Operation of 2-115
  Preventive Maintenance Checks and Services 2-102.32
Ramp Control Lever
  Location and Description 1-13
  Operation of 2-115
Ramp Door
  Location and Description 1-9
  Preventive Maintenance Checks and Services 2-102.32
Ramp Hydraulic Cylinder Access Cover 1-10,3-56
Ramp Hydraulic Fluid Level 2-85
Ramp Locking Handle
  Operation 2-115
  Purpose and Description 2-8
Range Selector
  Location and Description 1-13
  Operation 2-112.1
  Operation and Use 2-6
Rear Engine Access Panel and Seal (PMCS) 2-102.26
Rear Engine Compartment (PMCS) 2-82
Rear Lifting Eye 1-9
Receiver-Transmitter, Radio
  Controls and Indicators 2-32
  Operation 2-124
Receptacle, Trailer Light
  Location and Description 1-9
  Preventive Maintenance Checks and Services 2-102.54
Refueling 3-54
Remote Controls, Nightsight
  BRT (Brightness) Control 2-46
  CONT (Contrast) Control 2-46
  FOV (Field-of-View) Selector 2-45
Road and Idler Wheels 1-8,1-9,2-89
  Preventive Maintenance Checks and Services .. 2-66,2-162.8
Roadwheel Arms and Torsion Bars (PMCS) 2-102.14
Ruptured Cartridge Case 2-169

TA 158305

- S -

Seat, Driver's
  Controls 2-14
  Location and Description 1-13
Seat, Gunner's
  Location and Description 1-15
Seat, Squad Leader's 1-11
Seat, Troop 1-12
Seats (PMCS) 2-102.55
Selection of Site for Ground Emplacement 2-179
Shock Absorbers (PMCS) 2-102.12
Slave Cable Receptacle (PMCS) 2-102.53
Smoke (Grenade) Arming Firing Unit
  Purpose and Description 2-27
  Use in Firing Grenades 2-173
Smoke Grenade Launcher
  Firing 2-172
  Location and Description 1-7
  Loading 2-171
  Preventive Maintenance
    Checks and Services 2-88,2-102.16,2-102.47
  Unloading 2-174
Smoke Grenade Storage Box 1-7
Smoke Grenades 4-13
Speedometer/Odometer 2-5
Sprockets (PMCS) 2-102.11
Squad Leader's Periscope (See Periscope, Squad
  Leader's)
Starting of Vehicle
  By Towing 2-194
  Cold Weather Starting (+40°F to -25°F) ....
2-105
  In Extremely Cold Temperatures (Below -25°F) ......
2-189
  Normal Starting 2-103
  With External Power (Jump Starting) 2-193
Steering 1-26
  Differential 2-111
  Pivot 2-112
Steering Levers, Differential
  Location and Description 1-13
  Preventive Maintenance Checks and Services 2-102.4
  Purpose and Use 2-7
Steering Levers, Pivot
  Location and Description 1-13
  Purpose and Use 2-7
Stop Light
  Location and Description 1-9
  Operation 2-113
  Preventive Maintenance Checks and Services 2-101

TA 159306

- Stopping 1-26
- Stow Bracket, Launch Tube 1-14
- Stow Brackers, Erector - Launcher (PMCS) 2-102.46
- Suppressor, Electrical Transient
  - Controls and Indicators 2-27
  - Location and Description 1-11
  - Operation 2-124
  - Operation with Override Switch 2-203
- Suspension (PMCS) 2-92
- Suspension Items 2-97
- Switch, Air Box Heater 2-4
- Switch, ARMED/SAFE 2-38
- Switch Assembly, Main Lights 2-3
- Switch, Band, Radio Receiver-Transmitter 2-33
- Switch, Battle Override 2-37
- Switch, Beam Selecting 2-8.1
- Switch, ERECTION DRIVE 2-37
- Switch, Function, Radio Receiver-Transmitter 2-32
- Switch, Handgrip Actuator 2-39
- Switch, Horn 2-6
- Switch, INT ACCENT, Intercom Amplifier 2-28
- Switch, IR-BO Select 2-4
- Switch, Lamp Test 2-35
- Switch, Main Power, Intercom Amplifier 2-28
- Switch, MISSILE SELECT 2-38
- Switch, MODE SELECT 2-38
- Switch, Nightsight Actuator 2-52.1
- Switch, PWR, Amplifier-Power Supply 2-28
- Switch, RADIO TRANS, Intercom Amplifier 2-28
- Switch, RETICLE LIGHT 2-52
- Switch, SELF TEST, MGS 2-50.1
- Switch, Sight Select 2-39
- Switch, Slew Control 2-39
- Switch, SPKR (Speaker) Amplifer-Power Supply 2-31
- Switch, START 2-4
- Switch, TEST/OPERATE, Missile Guidance Set 2-50
- Switch, TURRET POWER 2-36

- T -

- Tabulated Data 1-17
- Tachometer 2-5
- Taillight Assembly 1-9
- TAMMS, The Army Maintenance Management System 1-2
- Telephone Set, Operation of 2-129
- Telescope, 3X
  - Acquisition of Target with 2-160.1
  - Location and Description 1-15

Tow Starting of Vehicle 2-194
TOW System Operation
    Dismounted 2-178
TOW Vehicle Power Conditioner
    Controls and Indicators 2-51
    Installation 2-144.2
    Removal 2-144.2
Towing Disabled Vehicle 2-195
Towing Hooks
    Location and Description 1-7
    Use 2-195
Towing Pintle
    Location and Description 1-9
    Preventive Maintenance Checks and Services 2-102.53
    Purpose and Use 2-22
Trailer Light Receptacle (See Receptacle, Trailer Light)
Tracks
    And Suspension System Principles of Operation 1-23
    Location and Description 1-8
    Maintenance of 3-44.1
    Preventive Maintenance Checks and Services 2-102.13,2-102.44
    Tension 3-44
Track Pad, Removal and Installation 3-45
Track Shoe
    Inspection of 3-42
    Replacement of 3-45
    Spare Shoe Location 1-7
Track Shroud
    Installation, Stowage, and Removal 3-48
    Location and Description 1-8
Transfer Gear Case Oil Level 2-82
Transmission Oil Level and Fuel Cut-Off Control (PMCS) ... 2-102.1
Traversing Unit, TOW
    Controls and Indicators 2-57
    Installation on Tripod 2-180
    Removal from Vehicle 2-179
TRIGGER, Missile Firing 2-39
Trigger, Tow Traversing Unit 2-57
Triggers (M901) 2-186.8
Triggers (PMCS) 2-102.66
Trim Vane
    Location and Description 1-7
    Preventive Maintenance Checks and Services 2-102.21
    Principles of Operation 1-27
    Purpose and Use 2-12
    Release 2-12

Tripod, TOW System
- Controls and Indicators 2-56
- Emplacement in Ground Mode 2-179
- Removal from Vehicle 2-179
- Retrieval 2-186.1

Troubleshooting 3-2
Turn Sign Lights (PMCS) 2-101
Turret
- Fire Control Equipment Operational Checkout 2-186.10
- Location and Description 1-6
- Operation in Cold Weather 2-188
- Operation in High Humidity 2-192
- Operation in Override 2-202.1
- Operation in Salt Water Areas 2-193
- Power, Principles of Operation 1-28.1
- Preventive Maintenance Checks and Services 2-102.67,2-102.75
- Slewing 2-186.8
- Slewing to Load 2-186.9
- Traversing 2-186.6

- U -

Universal Joints 2-195
Universal Joints (PMCS) 2-71
Unloading Launch Tube Ground Mode 2-185
Utility Outlet 2-2

- V -

V-Belts (PMCS) 2-102.24
Vehicle
- Power Conditioner 2-42
- Preventive Maintenance Checks and Services 2-64
- Exterior (PMCS) 2-65,2-76
- Interior (PMCS) 2-78
- Use of 1-2

Vehicle Batteries (See Batteries, Vehicle)
Vehicle Cleaning Instructions 3-39
Vehicle Lights
- Operation of 2-114
- Preventive Maintenance Checks and Services 2-83

Vehicle Maintenance 3-1
- After Swimming 3-67
- After Operation in Unusual Terrain 3-71

Vent Cover 1-9
Ventilator, Front 2-20.1,2-20.2
Ventilator, Rear Personnel Compartment 2-21
Vision Blocks 1-9

- W -

Water Operations 1-27, 2-203
Wheel Hubs (PMCS) 2-102.15
Window, Sight Gage 2-15
Windshield (PMCS) 2-102.55
Windshield Kit, Driver's 2-176.1

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

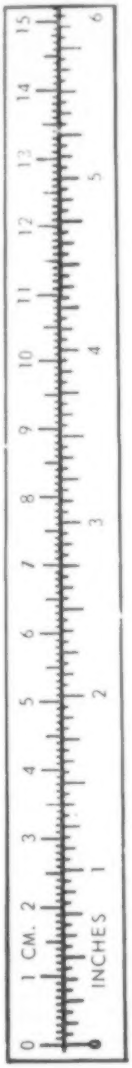
TEMPERATURE

5/9 (^{0}F – 32) = ^{0}C
212^0 Fahrenheit is equivalent to 100^0 Celsius
90^0 Fahrenheit is equivalent to 32.2^0 Celsius
32^0 Fahrenheit is equivalent to 0^0 Celsius
9/5 C^0 + 32 = F^0

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	**Miles per Hour**	**0.621**



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